



Volume 9 Edition 2



ADHYAY



DEPARTMENT OF ELECTRONICS ENGINEERING

VISION

"Department of Electronics Engineering (ELEX) will strive to achieve academic excellence in electronics and electronics related technical education in University of Mumbai to develop internationally competent professionals with a sense of responsibility and social sensitivity."

MISSION

To achieve academic excellence by creating the right ambience for nurturing and enhancing personal as well as professional skills that will enable students to compete globally.

PROBLEM SPECIFIC OUTCOMES

PSO1: To clearly understand the concepts and applications in the field of Electronics such as semiconductor technology, signal processing, embedded systems, communication etc. and acquire skills to Identify, formulate & solve problems in related fields of Electronics.

PSO2: To design electronics and computer-based components and systems for applications including signal processing, communication and control systems with the capability to comprehend the technological advancements with the help of modern design tools to analyze and design subsystems/processes for a variety of applications.

PSO3: To understand the impact of engineering solutions in a Global, Economic, Environmental, and Societal context and co-relate the learning to derive solutions to real world problems.

PSO4: To demonstrate skills to communicate in verbal and written form effectively and demonstrate the practice of professional ethics along with the concerns for societal and environmental wellbeing.

A MESSAGE FROM THE
HOD



DR. S.C. PATIL

The Electronics & Communication Engineering is one of the most dynamically changing and ever evolving branch since more than 100 years. Electronics is the foundation on which Information Technology and Computer Engineering has grown. Engineering with the latest tools such as VLSI Design, MATLAB , ARM CORTEX, LAB View, FPGA Board, to make students Industry ready. All high-speed networks and computers work on the hardware designed by electronic engineers. 21st century is the century of communication as communication engineering has been growing exponentially in recent years. At TCET, department of electronics Institute developed state-of-art laboratories & centres of excellence so as to train our students in Electronics Engineering through flexible, adaptive and progressive training programs, Bridge

Courses, Various project in signal System and communication Domain and other Domains along with cohesive interaction with the research organizations, academicians and industries and having experience faculties in the department. It is my pleasure to work with imminent students who eager to develop the carrier in Electronics Engineering.

A MESSAGE FROM THE

FACULTY INCHARGE



VAIBHAV GIJARE

On Tuesday, December 8th, 2020, Margaret Keenan of Britain became the first person in the world to receive the Pfizer-BioNTech COVID-19 vaccine outside of clinical trials. This is the end, or at least the beginning of the end, of a very long and arduous journey. If nothing else, this marks a new beginning, with tens of millions of vaccine doses of the Pfizer-BioNTech vaccine becoming publicly available right away, multitudes more to follow as production continues to increase, and a half-dozen other vaccines come to market beyond that. The vaccine has already been shipped and stockpiled around the world. The distribution chains have been primed, prioritization groups defined, and the vaccine promotional campaigns have already begun. In the US, the FDA is expected to grant emergency-use authorization as soon as tomorrow and, according to Pfizer's CEO, the vaccine would

be ready to ship "within hours." It will take time to bridge from now until we reach a state of wide-spread immunity to this horrible disease that has plagued us for so long. But it's time to start taking stock and planning for the future, which inevitably will occur. Some things will continue and may never go back to the way they were before. Others will dynamically shift as the world returns to normal in a post-COVID world. But one thing is certain, life will return to some resemblance of normal – and the time to start planning for it is now. Which is why this issue of our magazine is so important!

A MESSAGE FROM THE

IETE FACULTY INCHARGE



ARCHANA BELGE

As in today's world only bookish knowledge is not sufficient to stand oneself in the competitive world, we the Department of Electronics Engineering at TCET believe in overall development. We take care of the holistic development of students along with technical growth. We train students through various activities like Activity Based Learning (ABL); Project Based Learning (PBL); In-house Internship Programs, Workshops on upcoming technology and many more activities. In ABL we encourage students to develop their personality through various activities like debate, extempore, group discussions etc. In PBL students are guided to prepare projects by identifying real world problems and applying computing fundamental and technical skill to find solution to them. In-house Internship Programs are where students learn different coding languages

which makes them industry competent... Professional Body activities are specially planned to make students ready for their professional career, through various activities like Workshops in looming technologies, Seminars, hands-on session up to date trend in Electronics, software and hardware in different platforms, industrial visits at various places to understand the upcoming requirements in industries. Professional Body is formed by the students for the students. The Electronics Department Faculty believes in Great teachers. "The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires." – William A. Ward

WORDS OF WISDOM

POORVA WAINGANKAR (ASSOCIATE PROFESSOR)

If you're trying to achieve something in your life, there will be obstacles. I've had them, but obstacles shouldn't stop you from going ahead. If you see a big wall in front of you, don't turn around and give up. Find a way out how to climb it, go through it, or break it... Life always comes with challenges, it's your choice whether to take it or leave it

SUNIL KHATRI (ASSISTANT PROFESSOR)

There are always people who just work hard and people who work hard smartly. In order to rise above all other competitors, your approach to any problem should be in a systematic manner so that there's clarity regarding what to do and with the extent of priority to be given as well. Hence my words of wisdom to all students are - *"Be smart in your work methodology & set your priorities straight"*.

LEENA CHAKRABORTY (ASSISTANT PROFESSOR)

As a teacher, we do not only see our self as having the responsibility to teach and impart knowledge about different subject matters to our students; but, We also strive to motivate them to aspire to achieve excellence, and the best in whatever they do. Education is not a safety net. It is the rocket which will propel you towards success. All you have to do is have an aim and work on everything that takes to get a lift-off.

JALPABEN PANDYA (ASSISTANT PROFESSOR)

Education is not concerned with any ideology, nor is it based on any system, neither is it a mean of conditioning the individual in some special manner. Education in its true sense is helping the individual to be mature and free, to flower greatly in love and goodness. The highest function of education is to bring about an integrated individual who is capable of dealing with life as a whole.

SONAL BARVEY

In this day and age, where information is abundant and flowing in from all directions, the way forward is to broaden your perspective and expand your way of thinking. It is simply not possible to fit 20 litres of liquid into a container with a maximum capacity of 10 litres. Keep your conscience clear; at the end of the day, what matters most is how at peace you are with yourself. If you enrich your values, peace will come to you naturally!

SUJATA ALEGAVI

Excellence is never an accident, it is a result of high intension, sincere effort, intelligent direction, sincere effort, skillful execution, and the vision to see obstacles as opportunities.

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Artwork by Holly Guacamolly

STUDENT ARTICLES

GETTING INTO THE *Metaverse*

Mansi Vaghasiya - (SE ELEX)

What is metaverse? Well, the term “metaverse” originated from a science fiction novel named Snow Crash published in 1992 as a portmanteau of “meta” and “universe”. A metaverse is about social connection by building a network of 3D virtual worlds. In science fiction and futurism, the term is often described as a hypothetical iteration of the internet as a single universal virtual world that is aided by the use of augmented reality and virtual headsets. Varied metaverses have been developed for popular use akin to virtual world platforms like Second Life. Some metaverse redos involve integration between virtual and physical spaces and virtual penny-pinching, frequently encompassing a significant interest in advancing virtual reality technology. The term has seen considerable use as a buzzword for public relations purposes to exaggerate development progress for polychrome affiliated technologies and programs. Information isolation and user dependence are concerns within metaverses, stemming from challenges facing social media and videotape game diligence as a whole.

HARDWARE

Access points for metaverses comprehend general-purpose computers and smartphones, in extension to augmented reality (AR), mixed reality, virtual reality (VR), and virtual world technologies. Dependency on VR technology has limited metaverse development and wide-scale acceptance. boundaries of movable tackle and the need to balance cost and design have caused a lack of high-quality graphics and mobility. featherlight wireless headsets have blundered to achieve retina display pixel viscosity claimed for visual engrossment, while advanced-performance models are wired and frequently big. Another issue for wide-scale relinquishment of the technology is cost, with consumer VR headsets ranging in price from \$300 to \$ as of 2021. Current hardware development is concentrated on prostrating the limitations of VR headsets, detectors, and adding absorption with

haptic technology.

SOFTWARE

There has been no broad-scale acceptance of a standardized technical specification for metaverse executions, and being implementations count primarily on exclusive technology. Interoperability is a considerable concern in metaverse development, stemming from concerns about translucence and isolation. There have been several virtual atmosphere standardization designs.

In a January 2022 interview with Wired, Second Life generator Philip Rosedale depicted metaverses as a three-dimensional Internet that’s populated with live people. Universal Scene definition is a specification for a 3D computer illustrations intersection created by Pixar and supported by Blender, Apple’s Scenokit, and Autodesk 3ds Max. The technology company NVIDIA broadcast in 2021 they would borrow USD for their metaverse development tools. OpenXR is an open standard for access to virtual and enlarged reality devices and experiences.



The Roblox Metaverse

BIONIC CHIPS

A14 & A15

Athira Aravind (TE ELEX)

Like its archetypes, the A15 has two elite execution handling centres for the main work and four high-proficiency centres for foundation undertakings that can run ceaselessly as much battery power. In any case, Apple says they're quicker and upheld by another GPU, better execution neural motor for AI and AI assignments, and another picture signal processor for tasks like diminishing photograph commotion. The organisation divulged the chip at its iPhone 13 send off occasion.

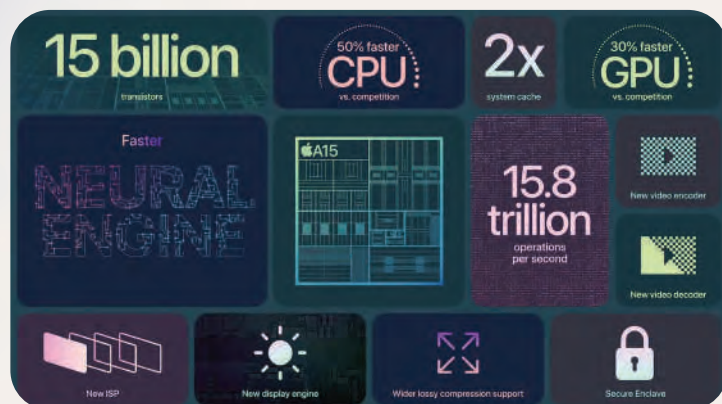
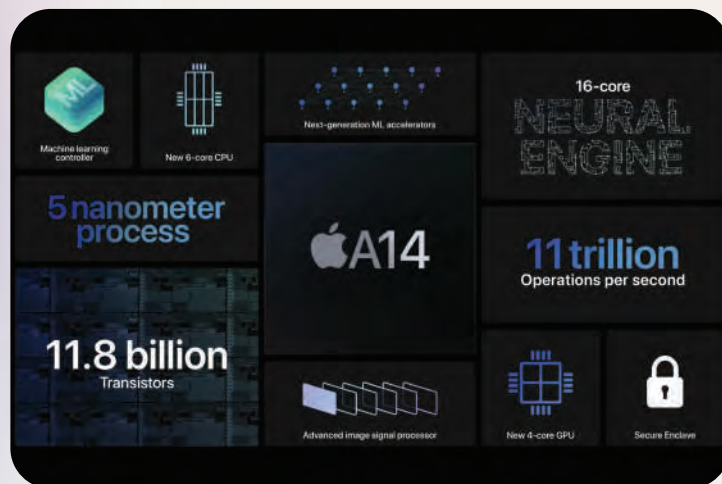
Apple flaunted the A15 has preferred execution over its rivals, a case that has been valid for a really long time, in view of the Geekbench speed test. In any case, the organisation didn't offer insights concerning how much better the A15 is compared and the A14. Qualcomm, the top chipmaker for the Android cell phones, procured startup Nuvia trying to give its processors a major speed help.

THE CHIP'S TOP WORK is to keep up with the ORGANISATION'S TOP SPOT FOR CELL PHONE SPEED, GUARANTEE IPHONES STAY THE MAIN GADGET DESIGNERS go after while making NEW APPLICATIONS, AND KEEP CLIENTS CONTENT WITH SMART EXECUTION AND A LONG HELPFUL LIFE EXPECTANCY FOR THE PHONE.

The Apple A14 Bionic is a 64-bit ARMv8.4-A system on a chip (SoC), designed by Apple Inc. It appears in the fourth generation iPad Air, as well as iPhone 12 Mini, iPhone 12, iPhone 12 Pro, and iPhone 12 Pro Max.

The A14 coordinates an Apple-planned four-centre

GPU with 30% quicker design execution than the A12. The A14 incorporates committed neural organisation equipment that Apple calls another 16-core Neural Engine. The Neural Engine can perform 11 trillion activities each second. Notwithstanding the different Neural Engine, the A14 CPU incorporates second-age AI grid scalar increase gas pedals (which Apple calls AMX blocks). The A14 likewise incorporates another picture processor with further developed computational photography abilities.



A14 & A15 Chips FAQs

IDENTITY CHIPS UNDER People's Skin

Noopur Divekar (SE ELEX)

From smartphones in our hands to smartwatches on our wrists to earbuds, technology is increasingly merging with our bodies. It's now literally getting under our flesh with a small microchip. An identifying integrated circuit device or RFID (Radio-Frequency Identification) transponder encased in silicate glass and implanted in the body of a human being is known as a human microchip implant. This sort of subdermal implant usually has a unique ID number that can be linked to data in a third-party database, such as personal identification, law enforcement, medical history, prescriptions, allergies, and contact information.

Thousands of people in Sweden have had microchips implanted in their hands. The chips are intended to make users' life easier by speeding up their daily routines and making access to their homes, offices, and gyms as simple as swiping their hands against digital readers. Emergency contact information, social media profiles, and e-tickets for events and rail travels can all be stored on chips.

While promoters of the small chips claim they're secure and resistant to hacking, experts are concerned about the type of personal health data that could be kept on them. The chips, which are about the size of a grain of rice, are implanted into the skin slightly above each user's thumb with a syringe similar to that used for vaccinations. Implanting chips in human beings has privacy and security ramifications that extend far beyond public cameras, facial recognition, location tracing, driving habits, money spending histories, and even data ownership, all of which represent important barriers to the technology's acceptance.

To have a sense of the big picture, you should realize that the use of chips is an extension of the Internet of Things (IoT), which is a universe of connected things that is growing by the minute, with over 30 billion connected devices by the end of 2020 and 75 billion till

2025. We are now looking at little chips producing big new privacy concerns, just as the world comes to comprehend the numerous benefits of the Internet of Things, but also learns about the 'evil side' of smart things,' including our connected cities.'

Like any new trend, it must overcome three difficulties in order to be accepted and become mainstream: technology, business, and society (regulations and laws).

THE FIRST CHALLENGE: TECHNOLOGY

In the world of IoT, chips are considered the initial constituent of a typical IoT system, which includes Sensors, Networks, Cloud, and Applications. The chip, as a sensor, literally touches your hand, heart, brain, and the rest of your body. This new invention will give a whole new meaning to the terms "hacking the body" and "biohacking." While cyber experts continue to be worried about protecting critical infrastructure and mitigating security risks that could harm the economy or result in a loss of life, implanted chips have an impact on health, but they also add to the risks and threats of sensor hacking, as sensors are the weakest link in IoT systems.

THE SECOND CHALLENGE: BUSINESS

there are numerous firms in this industry, and the prospects are vast in terms of replacing identification at stores, offices, airports, and hospitals, as examples. Chips will also give crucial physical data, which will be processed in the cloud to deliver business insights, new therapies, and improved services – presenting a big potential for many stakeholders in both the private and public sectors.

THE THIRD CHALLENGE: SOCIETY

As people grapple with the privacy and security implications of technologies like IoT, big data, public- and private-sector data breaches, social media sharing, GDPR, a new California privacy law CCPA, as well as data ownership and "right to be forgotten" provisions,

a set of technologies emerges that will become far more personal than your smartphone or cloud storage history, and the tiny chip under your skin.

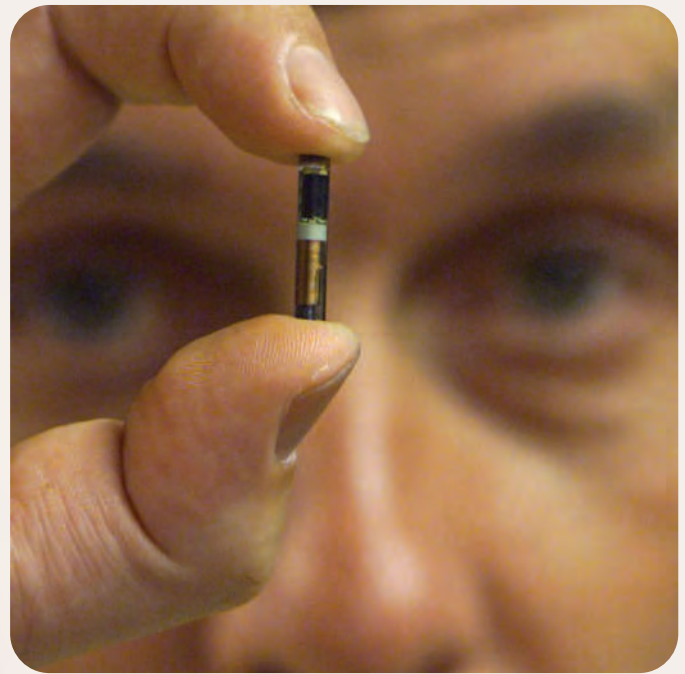
Consumer trust is built on three pillars: SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Security, Safety, and Privacy): SSP (Se

Infection hazards, MRI usage with chips, and corrosion of the chip's elements are all big concerns when employing tiny chips inside your body.

Stolen identities, threats to human freedom and autonomy are some of the security and privacy problems.

This technology is promising and another step toward more convenience and simplifying many of the daily tasks of billions of people around the world, but without strong security, safety, and privacy measures in place when using this tiny chip, we will be facing a cybersecurity nightmare with far-reaching consequences, in addition to an ethical dilemma in dealing with those who refuse to use it, who will be marginalized when it comes to jobs, for example. Two-thirds of employees in the United States and Europe feel that humans with chips implanted in their bodies will have an unfair advantage in the labor market in 2035, according to a recent survey. Many privacy advocates are concerned about the emergence of a surveillance state that uses this technology to track individuals.

Many people will see this technology as another attempt by both governments and businesses to gain access to another piece of data about us and add it to the many channels used now in gathering information because there are too many moving parts to deal with. Until we answer all questions related to this technology, many people will see it as another attempt by both governments and businesses to gain access to another piece of data about us and add it to the many channels used now in gathering information. Using our technological gadgets, knowing that by 2030, each person in the United States will have an average of 15 IoT devices.



Size and look of an average microchip



An X-Ray of where the chip was injected into the hand.

EXPLORING PERSONAL *Gas Monitor*

Aniket Gupta (TE ELEX)

Through continuously monitoring the user's breathing zone, personal gas detectors keep the workers safe from atmospheric risks. These detectors function at close range to the user.

Our personal gas detectors & monitors will enable you to work in even the most demanding industrial situations, such as hazardous regions and restricted spaces.

The Gasman portable single-gas detector is small and light, but tough enough for industrial use. A big display showing gas concentration, as well as audio, visual, and vibrating alarms, are included. It can be utilised in oil and natural gas, chemical plants (with unusual gases), steelworks (specific CO sensor), sustainable sources (hydrogen), and waste and water treatment plants for industrial gas detection. It's also available in a secure CO₂ variant that measures 0 to 5% carbon dioxide.

THE BASIC WORKING PRINCIPLE

Hydrogen sulphide (H₂S) gas takes only a few minutes to overcome. The respiratory system is paralysed virtually instantaneously, with no indication that there is a problem. The rotten-egg odour of hydrogen sulphide is well-known, although it is only noticeable at low levels, which might be annoying and provide motivation to flee. The poisonous gas levels prevalent mostly around manure storages, which can throw a human to the floor in respiratory distress, are of increasing concern. On oxygen usage as well as the central nervous system, hydrogen sulphide functions as a chemical asphyxiant.

When working with dangerous gases like hydrogen sulphide, gas monitoring has always been suggested. For on-farm use, portable gas monitors were available at a reasonable price. When working in toxic environments, there is, of course, a hierarchy for preventive measures that can be used. Ventilation of the location, risk assessments, and personal protective equipment (PPE) are all advised as layers of control (PPE: masks, respirators). This personal gas monitor detects potentially dangerous situations and alerts the user when it's time to flee. This preliminary report will

teach you about the most important details you consider when purchasing a hydrogen sulphide portable gas monitor.

WIDE USAGE

In addition to hydrogen sulphide readings, a multi-gas monitor for professional manure transporters can be fitted with sensors which measure additional dangerous methane gas, low oxygen levels in confined spaces, and carbon monoxide (emission) from machine operation. Methane is sometimes referred to as the LEL, or lowest detection limit of combustion products. Multi-gas monitors are around double or triple the price of single-gas monitors.

Personal H₂S gas detectors have a clip or ring that allows them to be attached to garments. Personal gas monitor should be placed inside the breathing zone, which means the monitor should be fastened to a neck, lapel, and breast pocket with a gas sensor exposed and unobstructed.



GOOGLE'S AI *Eye Doctor*

Noopur Divekar (SE ELEX)

Google seems to be ready to start a major experiment in using Machine Learning to increase access to Healthcare. If it succeeds, the company may be able to prevent millions of diabetics from an eye illness that can lead to blindness. Last year, Google researchers reported that they have trained image recognition algorithms to detect indicators of diabetes-related eye damage on par with human specialists. The software looks at images of a patient's retina for small aneurysms, which indicate the early stages of diabetic retinopathy, which can lead to blindness if left untreated.

A Google project executive revealed today at the 2017 WIRED Business Conference in New York City that work on integrating the technology into an Indian chain of eye facilities has begun. According to Lily Peng, a product manager with the Google Brain AI research division, the country is one of several areas around the world where a scarcity of ophthalmologists means many diabetics don't undergo the necessary annual test for diabetic retinopathy. "This type of blindness is absolutely preventable," she explained, "but because people can't get checked, half of them lose their vision before they're diagnosed." "One of this technology's promises is that it will make healthcare more accessible." Diabetes affects over 400 million people worldwide, including 70 million in India. Earlier this year, Peng, an MD, was named to WIRED's Next List of 20 tech visionaries shaping the future.

GOOGLE IS COLLABORATING WITH THE ARAVIND EYE CARE SYSTEM IN INDIA, a network of eye hospitals THAT WAS FOUNDED IN THE *late 1970s* and is credited with helping TO LOWER THE PREVALENCE OF CATARACT-RELATED BLINDNESS IN THE COUNTRY.

Aravind contributed some of the photos needed to train Google's image parsing algorithms, which helped the company construct its retinal screening system. The technology employs the same deep learning technique that enables Google's image search and storage service to distinguish between dogs, cats, and humans.

The precision of that technique when applied to retinal pictures was only documented in Google's article from last year, not its use in the clinic. Peng announced today that Google has just completed a clinical study with Aravind in India, indicating that the technology has been used in real-world patient care. She noted that work is now on to get the technology into the hands of patients on a regular basis. While this technology may benefit patients, it may result in fewer jobs for doctors, according to Peng. She claims that Google's algorithms will instead perform screening jobs that are currently not being done due to a lack of qualified personnel, allowing physicians to focus on other vital tasks. "There isn't enough expertise to go," Peng said. "We need to have our specialists working on treating sick people."



Screening using Google's Algorithm

GOVERNMENT INITIATIVES *for the Environment*

Mayur Chavan (TE ELEX)

We live in a globalised world that is propelled by the power of industrialization. Horsepower is no longer just a unit of power; it can also be used to assess the level of development in various countries. Is the picture, however, as rosy as it appears? One of the most heinous manifestations of development has been the massive degradation of the environment. And, unfortunately, there is no way for this scenario to be changed. All we can do is make a small difference by exercising control. India, like all other countries, has attempted to do its part by launching various initiatives to preserve its wilderness and reduce carbon emissions. Because, in the end, the burden is on us, and there is no turning back.

HERE ARE four initiatives THAT HAVE PROVEN TO BE GAME CHANGERS IN TERMS OF reducing carbon footprints AND RESOLVING THE country's climate AND environmental issues, EITHER IN A GOOD WAY OR A BAD ONE.

NRDC'S INDIA CLIMATE CHANGE AND CLEAN ENERGY INITIATIVE:

In 2009, the Natural Resources Defense Council launched an initiative to create a low-carbon, sustainable economy. The National Resources Defense Council collaborates with its Indian partners on four major projects:

- Improving the building's efficiency.
- Strengthening US-India climate change cooperation.
- Preparing for the effects of climate change on public health.
- Improving environmental governance.

This initiative is built on some very interesting end goals, one of which is strengthening environmental governance which has experienced a major setback in

the last few years. Panels like the National Green Tribunal and the Ministry of Environmental Affairs need to act on strong grounds in an unbiased manner.

SAVE HIMALAYA CAMPAIGN

The Save Himalaya Campaign is an initiative of the Indian Environmental Society that aims to protect the Himalayas by enlisting the help of communities from across the region. The Himalayas are unquestionably India's protector ranges. The programme focuses on understanding the Himalayan ecosystem and developing policy measures to ensure its long-term viability. The mission seeks to address several critical issues, including:

1. Himalayan glaciers and their associated hydrological consequences.
2. Conservation and protection of biodiversity.
3. Conservation and protection of wildlife.
4. Traditional knowledge societies and their means of subsistence, and
5. Planning for the Longevity of the Himalayan Ecosystem

PEPSICO INDIA'S WASTE TO WEALTH INITIATIVE:

PepsiCo India collaborates with Exnora, an environmental NGO, on this income-generating initiative that benefits over 500,000 people in India. This programme recycles 80 percent of people's household garbage and converts biodegradable waste into organic manure. It also has a community outreach programme.

This programme is entirely dependent on community participation. The initiative has already recycled nearly 35,000 tonnes of garbage that would otherwise have been disposed of in landfills. However, Pepsi and Coke have both been chastised for harming the environment. Their plastic bottles and plants are still not as green as they claim, as has been repeatedly highlighted in the media.

NATIONAL WETLAND CONSERVATION

PROGRAM:

The Government of India established the National Wetland Conservation Program in 1985 after identifying 115 wetlands that required immediate attention and developing a Management Action Plan for the next 4-5 years. Following the identification of wetlands under the Scheme, the States/Union Territories are required to submit long-term comprehensive Management Action Plans (MAPs) for a period of 3-5 years, preferably 5, coinciding with the Plan period.

There are numerous environmental initiatives in operation at both the national and global levels; however, they will be effective in practise only when environmental issues transcend international borders. "Right to Develop" is no excuse for developing countries to take a lax approach to environmental issues. And "the onus is on developing countries" is not an excuse often used by developed countries. We must recognise that, while we may share different land masses, we share the same environment.

So, in conclusion, it is also our responsibility to look after the problem, and we must also take small steps towards it, such as turning off lights when leaving a room, consuming organic products, and cooperating and supporting the government with all of the policies that they are bringing for a better environment.



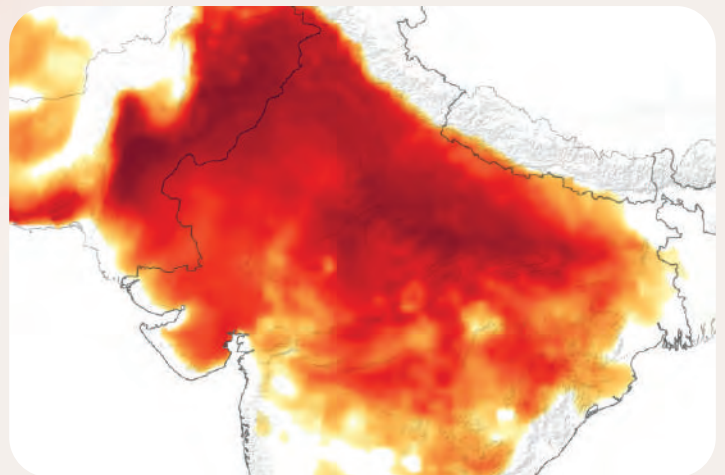
Solar Power Incentives under Climate Change and Clean Energy Initiative



Himalayas Before & After (1921 & 2009)



Indian Wetlands



Heat Wave in India (April 2022)

SMART Homes

Jigar Mathukiya, Akshay Yadav, Rohan Kushvaha (SE ELEX)

A smart home allows homeowners to control appliances, thermostats, lights, and other devices remotely using a smartphone or tablet through an internet connection. Smart homes can be set up through wireless or hardwired systems. Smart home technology provides homeowners with convenience and cost savings.

In 10 years, a variety of technological advancements will propel smart-home technology far beyond what is currently available on store shelves. Artificial intelligence advancements, for example, have the potential to disrupt practically every aspect of our lives, including our houses. Every morning, you may already use an AI-powered voice-assistant device to receive the latest news or weather prediction.

HOWEVER, IN THE FUTURE SMART HOME, AI PLATFORMS could serve as THE BRAIN FOR ENTIRE HOMES, learning about people AND COORDINATING AND AUTOMATING ALL OF THEIR NUMEROUS SMART GADGETS.

Crestron, for example, is developing software that tracks a person's preferences, such as which music they want to hear in the morning or which lights they want to be turned on at a specific time of day. Then, once it gets the hang of a user's preferences, it automatically plays just the right playlists or dims the lights before bedtime. "That's really the next evolutionary step in true automation," says John Clancy, head of Crestron's residential business.

All of the learning and scanning that the smart home of the future will accomplish may generate legitimate privacy issues. Indeed, hackers have already targeted some smart-home gadgets, either to gain access to the data they contain or to use them as instruments in wider cybersecurity operations. In 2016, hackers took

control of hundreds of thousands of vulnerable IoT devices and used them to transmit fraudulent Internet traffic to target websites in the aim of crashing them; the incident momentarily disrupted Internet connections across North America and Europe. Whether you intend to or not, you're more likely than not to end up in a connected house one day. Experts predict that, in the end, people will see smart-home technology as important as power, refrigeration, or air conditioning.

ADVANTAGES

Safe homes are the most important aspect of any house. No matter how many locks you use for your house, the risk of burglars and thieves breaking into your house is always there. But having a smart home will lower your security risks by providing security alerts when something happens wrong.

Energy saving is probably the primary concern for every house owner. Hence, you would always want to make sure that there is no amount of energy wastage and your home needs to fulfill the need of energy efficiency.

DISADVANTAGES

The biggest problems, con or disadvantage of a smart home system is the cost. There are quite a number of companies that provide the smart home system, but all of them are quite expensive. This is something that only a few can afford. You would be able to have a good savings and income to install this system.

The basic requirement for the smart home system is the internet. Without a good and strong internet connection, you will not be able to take control of this. If there is no internet connection for some reason, there is no other way through which you can access and control your system.

SMART *Offices*

Mansi Vaghasiya, Aman Verma (SE ELEX)

The decarbonization challenges for buildings are significant, so are the opportunities. Efficient, zero carbon buildings take advantage of available, cost-effective technology to reduce emissions while increasing health, equity and economic prosperity in local communities.

Global warming will itself result in more electricity demand as previously moderate regions, as recently occurred in the US Pacific North-West, require air conditioning to minimize heat stress. This will, in some cases, result in higher costs for building owners due to the lower (often subsidized) cost of fossil energy and increased electricity infrastructure investment for expanded generation, transmission, distribution and management of an increasingly intermittent renewable energy supply.

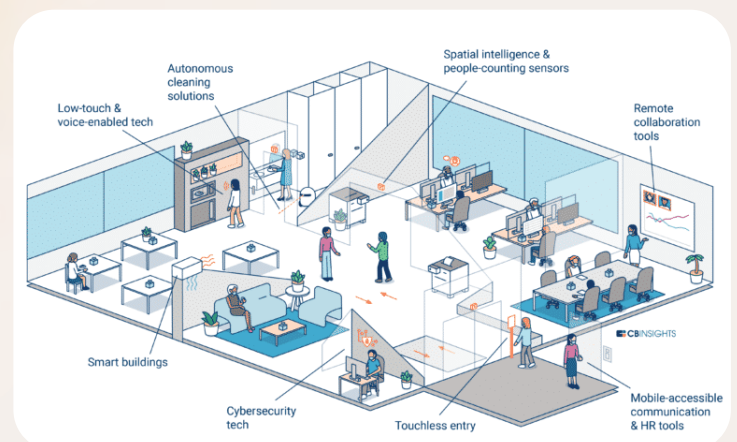
Energy efficiency must remain a top priority for zero carbon buildings, even with a decarbonized energy supply. While passive measures, such as increased insulation and higher efficiency equipment, can reduce overall electrical demand, active efficiency measures including automated demand response and dynamic energy optimization can provide demand flexibility to match intermittent renewable generation. Digitalization is an important enabler of energy efficiency and demand flexibility in buildings. These “smart” buildings benefit from advanced sensing and controls, systems integration, data analytics and energy optimization to actively reduce energy use and demand while also improving occupant comfort, health, productivity and facility resilience. Embedding these digital capabilities in “smart” equipment and appliances can provide additional benefits including improved reliability and remote management in addition to energy and emissions reductions.

The potential energy savings from smart buildings is significant. Basic automated building controls can save 10-15% of energy in commercial buildings. More advanced functionality, such as demand-controlled ventilation, can save an additional 5-10% in energy.

Integrating building systems together can yield incremental energy savings of 8-18% over basic HVAC (heating, ventilation and air conditioning) and lighting control. Energy Information Management Systems that use advanced metering infrastructure and monitor the end use in buildings save 3% on average, while automated fault detection and diagnostics can save an average of 9% in energy use.

A recent study suggests that Grid-interactive Efficient Buildings (GEBs) can reduce energy costs by up to 20% through active demand management. Energy optimization can control a building’s energy use based on the real-time carbon intensity of the grid and coordinate the use of clean heating resources with backup fossil fuel equipment to minimize carbon emissions on a 24/7 basis while providing demand flexibility and resilience.

Smart offices are driven by new technologies and an increasingly sustainability-minded public, the demand for smart offices with a low carbon footprint have accelerated, changing the way businesses manage their offices and teams. This presents a great opportunity for office buildings to position themselves as early movers and lead the way in sustainable innovation that can achieve net-zero emission targets.



A Smart Office Prototype

INTRODUCTION

To DevOps

Sandesh Gavali (SE ELEX)

Andrew Clay and Patrick Debois had a conversation in 2008 that sparked the idea for DevOps. They were concerned about Agile's shortcomings and desired to devise a better solution. The concept gradually gained traction, and with the DevOpsDays event in Belgium in 2009, it became somewhat of a catchphrase.

WHAT IS DEVOPS?

DevOps is a set of cultural ideas, practises, and tools that improves an organization's capacity to provide applications and services at high velocity: changing and enhancing products at a faster rate than traditional software development and infrastructure management methods.

DevOps affects all stages of the development and operations lifecycle. DevOps pulls together the skills, methods, and tools from every aspect of an engineering and IT organisation, from planning and building to monitoring and iterating.

WHY IS DEVOPS IMPORTANT?

REDUCED TIME TO MARKET

One of the primary reasons why DevOps is vital for your business is that it allows you to provide software more quickly due to optimised processes, proper automation, methodical release planning, and other factors. A shorter time to market means you have a better chance of outrunning your competitors.

FASTER INNOVATION

Because of faster product delivery to market, you can innovate faster than your competition. The DevOps culture also allows the team to openly contribute groundbreaking ideas and discuss their perspectives in real-time communication.

INCREASED EFFICIENCY IN DEVELOPMENT

In DevOps, software engineers do not need to spend time on tasks that are completely automated. The quantity of manual labour is kept to a bare minimum. Parallel workflows, acceleration tools, scalable

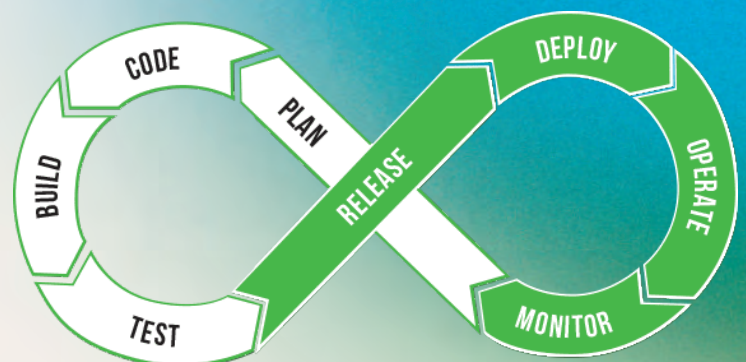
infrastructure, continuous integration servers, and other features all help to ensure efficient development.

HIGHER RELIABILITY

Processes including development, deployment, and others become more predictable and error-free. DevOps and continuous testing provide shorter development cycles, allowing the team to detect any inconsistencies in the product in a timely manner. It is simple to fix difficulties and also incredibly easy to roll back a deployment at any time.

CUSTOMER SATISFACTION

Another significant argument for the importance of DevOps is that the customer-centric approach, regular feedback, faster market delivery, and ongoing improvement all lead to the most fulfilling results in software development.



Enterprises seeking to scale AI development capacity from dozens to hundreds or even thousands of machine learning models can benefit from the same engineering and operational discipline that DevOps brought to software development.

GREEN BUILDING & *Infrastructure*

Sachin Tiwari (TE ELEX)

There's a need to boost India's Green Building Infrastructure:

This can be achieved through a regulatory framework that promotes global climate change mitigation and green buildings across the country and by strong implementation of the prevailing

policies. If we've learned anything over the last 10 years of green building innovation and therefore the construction of smart cities and communities, it's that what gets measured gets done. What gets done gets improved. And what gets improved, gets replicated. By tracking and measuring building and community performance, cities, states, and nations can make improvements, raise the quality of living for all and become true catalysts to reversing the greatest existential threat of our times: climate change. As the country with the second highest population, India has a powerful role to play in demonstrating leadership across the globe. The good news? Such leadership has been happening for over a decade. The government has committed to reducing emissions by 33-35 per cent, increasing non-fossil-based power capacity and reducing carbon by almost three billion tons by 2030.

STEPS TAKEN BY THE GOVERNMENT TOWARDS GREEN INFRASTRUCTURE:

India has been on the forefront of change, including the 2006 National Environmental Policy, which targeted several challenging issues including pollution, waste management and energy, and the 2008 National Action Plan on Climate Change, which focused on the critical balance between economic development and climate change. The government has also made housing for all a national priority with the introduction of the Pradhan Mantri Awas Yojana (PMAY) in 2015, which set in situ a goal of providing affordable housing to the urban poor by 2022. Less than two years later, PMAY's goal was expanded to incorporate those living in rural areas also. We all know robust economic development is important for India. We also know that smartly assessing and controlling its impact on our

surroundings is equally important for securing our planet for future generations.

EMBRACING SUSTAINABILITY:

The rising number of environmental catastrophes has led several countries to implement resilient green buildings across all construction sectors. For instance, the EU has planned an environmentally friendly economic recovery from the repercussions of the Covid-19 pandemic. Its plan is to focus on building renovation, renewable energy and clean hydrogen fuel with attention on low-carbon investments.

INDIA IS CURRENTLY THE FOURTH LARGEST MARKET WITHIN THE WORLD FOR green buildings, TOUCHING every building sector.

This in-country leadership in green buildings and green construction has contributed greatly to economic process and development, while simultaneously making smart investments for the longer term.

THE WAY FORWARD

A meaningful regulatory framework to advance global climate change mitigation and green buildings across India are often successfully achieved with a robust implementation of current national policies and their replication and enforcement at the State level, and therefore the undertaking of holistic, additional measures which will quicken the pace of green building. These additional measures include improving resilience, supporting public transportation, supporting green spaces, supporting public health and wellness, promoting equity, and more. National policies and their replication and enforcement at the State level, and therefore the undertaking of holistic, additional measures which will quicken the pace of green building.

ASTERIA AEROSPACE'S *SkyDeck*

Priyanshu Giri- (SE ELEX)

Over the past two decades, the production and use of drones has increased dramatically. Drones are unmanned aerial vehicles (UAVs) used for military, search and rescue, commercial, and human activities. The development of computer technology has contributed greatly to the development of new systems for drones and their widespread use. The Drones were fortresses used by military organizations for air raids and airstrikes. At first, there were balloons and kites. However, with the advent of technology, they became more and more self-sufficient, an automated component. Drones are an emerging sector of the aviation industry that has been received differently by the public mainly because of the potential for abuse, breach of privacy, and military use in combat. Recently, a subsidiary of JIO which is Asteria Aerospace launched its first drone software platform which is SkyDeck.

WHAT IS ASTERIA AEROSPACE?

Asteria Aerospace designs and develops drone-based solutions to transform business operations using online data. For the past 10 years, Asteria has been producing high-quality, high-quality, reliable and durable drones. Asteria also develops visual and analytics software solutions to convert online data from drones into functional intelligence. Our products and solutions are widely used by national security and defence organizations, government institutions, and the private sector in areas such as security, energy and resources, agriculture, GIS, construction and mining.

WHAT IS SKYDECK?

SkyDeck is a cloud-based software platform to deliver Drone-as-a-Service (DaaS) solution for a variety of industry issues, such as agriculture, testing, industrial testing, surveillance and security, according to the company's release. SkyDeck provides integrated dashboard and drone navigation management services, drone aircraft design and design, data processing, visualization and AI-based analysis of aerial data captured using drones. In the field of

agriculture, SkyDeck provides data and data that can be used to accurately measure crop characteristics, assess plant health and increase agricultural inputs. In key areas of infrastructure such as oil and gas, telecom, and energy and resources, SkyDeck integrates the power of drones to be digitally monitored and monitors assets to keep them safe, detect threats, and record changes.

SkyDeck can also assist in the efficient use of drones in various government programs and programs such as Svamitva Scheme, Smart Cities, Agristack, and other development projects. Neel Mehta, Founder and Director, Asteria Aerospace, shares, "The recent release of drone operating regulations and the promotion of DaaS by the government have increased the demand for drones in all sectors of the industry. Asteria is already among the leading manufacturers with the launch of SkyDeck, we are addressing the need for an hour with integrated drone hardware, software, and operating solution, drone by measure". The diverse nature of SkyDeck brings with it the promises of efficiency of the company in various fields.



Jio's Asteria Aerospace's cloud based drone operation

THE ALL-DIGITAL *Transformation*

Kulin Goyal (TE ELEX)

People in today's society are too busy to sit and read a page of information; instead, they prefer to watch a presentation and get the message. It has reached a stage where photos and videos are increasingly employed to market a product or service, and this trend has spread beyond corporations into our daily lives. We're all so rushed that we wave instead of saying "goodbye," flash our watches to show the time, and so on. When we evaluate that we are using our hands & actions to communicate what we have been up to or capable of, this is a healthy habit.

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Data science & artificial intelligence (AI) are used by this centre to extract information insights and construct smart technologies that assist enhance the delivery of services to the citizens and, in turn, support government national policies & digital transformation. This centre additionally leads the way in assisting government agencies in their transformation by empowering law officials to improve their prescriptive analytics and collaborating with other organisations to help their data strategy and infrastructure.

INTERNET OF THINGS (IOT) AND SENSORS

This centre is responsible for the design and development of a Whole-of-Government IoT infrastructure based on the Smart Nation Platform. Smart items, both static and mobile, including such wearables, sensors, and mobile devices, will be able to link to this infrastructure, which will allow for high-speed data transmission from the sensors. The centre will also strengthen the government's skills in new and emerging technologies, collaborating with businesses, research institutes, and government agencies to test and pilot new solutions to solve challenges.

INFRASTRUCTURE FOR GOVERNMENT ICT

This centre creates a centralised Information and Communications Technology (ICT) framework that can be scaled across government departments, including data centres, applications, devices, networks, and other infrastructure. The centre specialises in building infrastructure that is agile, safe, robust, and cost-effective for government operations while also improving the customer experience for public officials. The centre additionally provides recommendations and help to government entities in addition to this core ICT architecture.

CYBERSECURITY

This centre creates a complete array of cybersecurity technologies to fulfil its missions as the Government's cybersecurity lead. These include blue-teaming capabilities for detecting and responding to cyber attacks, as well as red-teaming capabilities for discovering cybersecurity risks in government ICT & smart systems. This centre, in addition to developing cyber-defence capabilities, collaborates with other agencies to design secure architectures as well as provide cybersecurity management and technical guidance, all of which contribute to a better, more secured Smart Nation.



The Metaverse

MARKETING STRATEGY OF *Power Gummies*

Sweta Mehra (SE ELEX)

In this article, we will go over Power Gummie's entire marketing plan. But, before we get into the meat of the investigation, let's take a look at the company's history, target market, and online presence.

STP: SEGMENTATION, TARGETING, AND POSITIONING

- **Segmentation:** Power gummies come in a variety of flavors. Gummies for that time of the month, supplements for beautiful hair and nails. It also sells a variety of supplements, such as beach body. It features a large and diverse supplement collection. This company operates on a B2-B and B2C basis. The pricing range of the company's products ranges from low to mid to premium, depending on the consumer's budget.
- **Targeting:** Power gummies are for people who are just starting out on their journey to a beautiful body, hair, and skin. In most cases, the age range is between 17 and 26 years old and 20 and 40 years old.
- **Positioning:** Power Gummies are well-positioned in the market to meet customer demand since they provide one-of-a-kind services.

MARKETING CHAMPAIGN

Power Gummies (Aesthetic Nutrition Pvt. Ltd) launched the #GummyUpShapeUpDressUp digital campaign to promote the debut of its unisex wellness gummy vitamins for people who want to live a healthy and fit lifestyle. The campaign invites influencers to showcase their morning routines, but not to forget to take their vitamins, using social media influencers and Instagram's newest video sharing tool, 'Reels.' The 45-second campaign jingle is in line with the brand's ethos of holistic wellness and everyday nourishment as a never-ending endeavor. The brand hopes to give traditional vitamins a facelift and make health fun for everyone by targeting those aged 18 to 50 who dislike chewing on bitter, hard-to-swallow vitamin capsules. The development in Dubai is in keeping with the

company's aim of expanding its global footprint and establishing Power Gummies as a global brand. While the items will initially be exported to Dubai, Power Gummies intends to open a warehouse there to assure quick delivery throughout the UAE. In the following months, the company also intends to increase its market presence by opening top-quality modern retail outlets. "We are really confident about responding to consumer expectations while meeting demands and ensuring their health and well-being," stated Divij Bajaj, CEO, and Founder of Power Gummies.

SOCIAL MEDIA MARKETING

Power gummies are active on social media platforms such as Facebook, Instagram, Twitter, Pinterest, and YouTube. Social media marketing accounts for 70-80% of its revenue.

When we talk about Social Media Marketing Power gummies are doing quite a good job. They are just doing a poor job on Twitter and Pinterest.

Observations:

The color combination of blue and pink on their Instagram handle indicates that the firm is attempting to appeal to females. The merchandise photographs on their Instagram feed are all Featuring influencers. However, this is great; they have 263k followers, but they receive very few likes and comments on their posts.

Social Media Platform	No. of Followers
Facebook	24,322 followers 23,826 likes
Youtube	378k subscribers
Instagram	263k followers
Twitter	28 followers
Pinterest	8 followers

SEO STRATEGIES

In digital marketing, if a website has less than 500 organic keywords, it has a poor SEO strategy; if it has

1,000-2,000 keywords, it has a weak SEO strategy. The number of organic keywords for the Power gummies website is 1,062. That signifies that the SEO strategy of the organization is google i.e. neither bad nor good. To increase organic keywords, the organization needs to improve its SEO approach. If we look at the website traffic graph, traffic was higher in December 2021.

INFLUENCER MARKETING

Shraddha Kapoor, a well-known Indian actress, is the face of Power Gummies. She became a brand ambassador in 2021, has been in numerous commercials and is the primary influencer for Power Gummies. To improve its brand name, Power Gummies employs a large number of social media influencers. Influencer marketing broadens your reach and elevates your brand's position in the marketplace. Users can discover more about your company, your narrative, and the products or services you offer by following you on social media. Other influences for Power Gummies include Shrishti Rodye, Anusha Dandekar, and Surbhi Jyoti, all of whom are reality show stars.

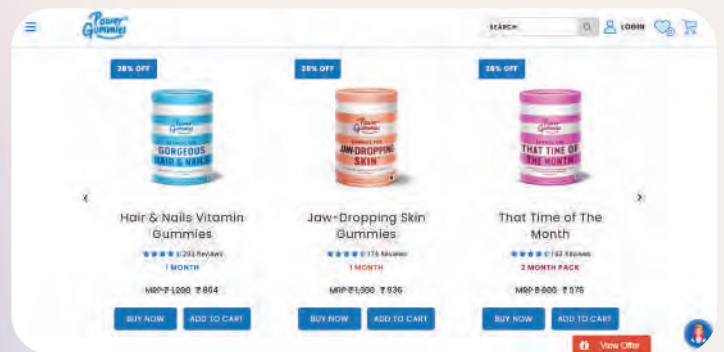


Shraddha Kapoor - Brand Ambassador of Power Gummies

E-COMMERCE STRATEGIES

In 2019, Alfa Ventures, a venture capital firm, invested in Power Gummies for the first time. They got two more rounds of funding in 2020: the first was a seed round led by Venture Catalysts and DSG Consumer Partners, and the second was a bridge round led by Agility Venture Partners with participation from DSG Consumer Partners.

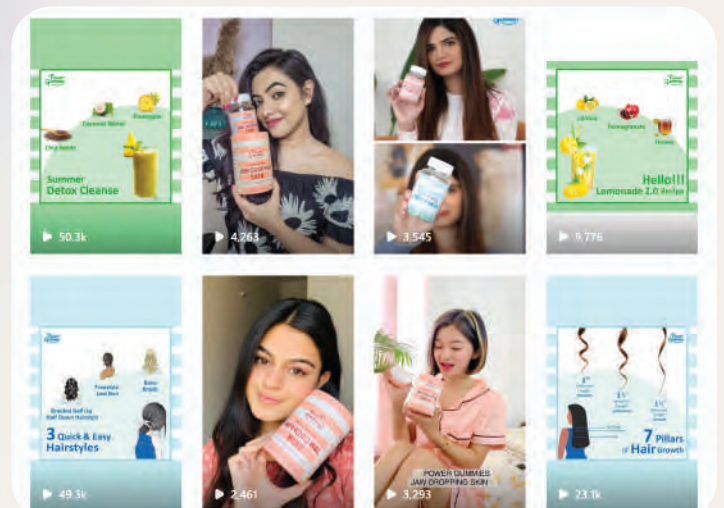
They intend to use the funding for marketing, expanding their team, and launching more nutritional supplement variations. Apart from being FSSAI and FDA compliant, the company claims that the gummies are made with vegan-based components, include no sugar, are gelatin and gluten-free, contain no pesticides, have no artificial color, and are 100% vegetarian. According to a statement, the supplements have been lab-tested for quality, clinically examined, and scientifically validated by biotin-based research published in European Food & Safety Association publications. The company sells its items through its direct-to-consumer website and on e-commerce sites including Amazon, Flipkart, and Nykaa.



Their website and best products.

CONTENT MARKETING STRATEGIES

When it comes to content, they are primarily active on social media platforms such as Instagram, Facebook, and YouTube. Their YouTube channel features films from three days and months ago, most of which are about health and how one should approach it. They also have a lot of Youtube short and reel videos, however, they aren't particularly unique, with only 5k views on average per Reel.



Reel Engagement on their Instagram Page

NFTS & THE *Metaverse*

Maharshi Thakkar - (SE ELEX)

Most people can see NFT as just a picture of digital art or collections that they can sell at great prices. However, the hustle and bustle of digital art in modern times has opened up many new opportunities with NFTs. For example, the metaverse connection of NFT undoubtedly reflects the promising nature of NFT use. The future of NFT brings many new opportunities for investors, businesses, and hobbies, which can shape NFT use and long-term acceptance. One of the most notable cases of the use of NFTs, which have been gaining attention in recent times, could point to metaverse access. Will NFTs help achieve metaverse? Do they have the value to define what the metaverse will look like in the future? The metaverse NFT interplay is undoubtedly outstanding for anyone following the blockchain space. The following discussion will help you discover how NFTs can play an important role in metering.

IS NFT PART OF THE METAVERSE?

Almost all conversations around the metaverse point to opportunities to combine metaverse and NFTs together. At the same time, many people also think that NFTs are just another part of the broad metaverse. In fact, you may find that NFT and metaverse are considered similar. The main reason for this speculation points to the sudden explosion of NFTs growth in the blockchain gaming industry. It is reasonable to conclude that the metaverse will be formed only from the visible worlds. Collaborative games can drive metaverse development by providing visual worlds. In addition, the association of real-life identities with digital avatars offers opportunities to define metaverse access through NFT. The first example of an NFT metaverse token appeared in 2019 with an example of NFT-controlled access. The first NFT.NYC conference in 2019 used an NFT-based ticket to allow entry into the event. Even if no one calls the conference "metaverse," they set a good example for NFT metaverse interplay.

With promising ratings, many new projects have emerged in recent times to make money off road

crossings between NFTs and metaverse. The projects are primarily focused on introducing major changes in online interactions. The Decentraland example shows how users can get ownership of real estate on the metaverse with LAND tokens.

WILL NFTS BUILD METAVERSE?

Metaverse is a great concept, and NFTs can serve as an important concept in a broader ecosystem. NFT metaverse projects will drive opportunities to use NFT as a title deed in a visible area. NFTs can assist in obtaining exclusive access to the site through a metaverse that is compatible with allowing access to others. Interestingly, the operation of a smart contract in NFT can also help in the sale of real estate in the surrounding area. The conditions for the use of NFT in metaverse will focus more on NFT-controlled access in the early stages of metaverse development. As the first real-world example of implementing NFTs in metaverse, NFT-controlled access can help ensure VIP access to real events and metaverse events.

NFTs can also play an important role in releasing branded sales or special access rights for fans. In addition to improving fan engagement efficiency, NFTs can streamline problem-free interaction with infrastructure that supports local-based engagement features and additional facts. Therefore, it is clear that metaverse and NFTs are designed for each other.

EFFECT OF NFTS ON METAVERSE

In your quest for answers to "Is NFT part of the metaverse?" you may have found different ways NFT can help build metaverse. However, it is important to point out the importance of NFTs in transforming the basic metaverse design. You should be aware that NFTs may introduce pre-existing social networking interruptions of user interaction, transaction, and interaction in metaverse.

THE RISING CYBERCRIME

DDOS

Mayur Chavan (TE ELEX)

Distributed Denial of Service is a special type of cybercrime in which Denial of Service (DoS) attacks are “distributed”. It is designed to disrupt a website or network by bombarding bot traffic. This is a modern age weapon to take revenge, extortion, financial & political gain on the internet. A DDoS attack can cause massive service disruption, causing organizations to lose huge capital. DDoS Causes request service is no longer available or only to a very limited extent.

DISTRIBUTED REFLECTION DENIAL OF SERVICE ATTACK (DRDOS)

DRDoS techniques normally include multiple infected machines that unwittingly participate in a DDoS attack on the attacker’s objective. Requests to the infected host machines are redirected, or reflected, from the infected hosts to the target. Via IP spoofing (Sending IP packets with forged IP sender addresses). The rise in connected devices because of the IoT(Internet of Things) creates an attractive target for cybercriminals, since they can be used as tools for DRDoS/DDoS attack.

TYPES OF DDOS

DDoS can be caused by infecting multiple computers with malware, which they then use to take control of these computers unnoticed. The hacker misuse this infected computer network-botnet- to carry out remote-controlled DDoS attacks.

There are many kinds of DDoS attack. One of the most used methods is to overload layer 3 & 4 system resources or bandwidth. From the past decade, the pattern among attackers has shifted to layer 7, but the patterns and bandwidth in DDoS attacks change on a regular basis. TCP SYN floods and UDP-based reflection attacks are among the most common attacks on the network and transport layer(layer 3 and 4). Furthermore, ways of attack include UDP fragmentation, ICMP flood, UDP amplification, RST flood, SSDP and ACK flood.

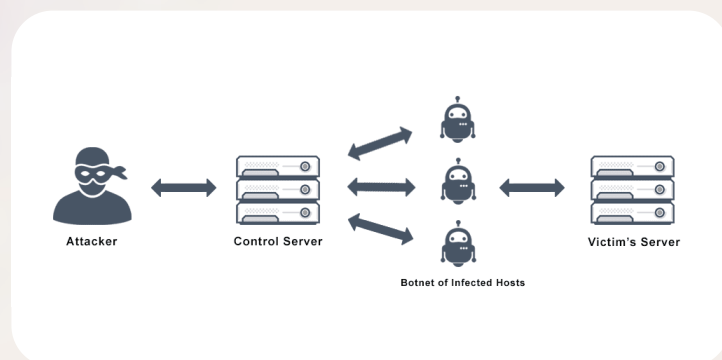
DDoS attacks on the application layer (7) are based on

the connections which have been established and have become one of the most well-known types of attack. These attacks are usually not detected by the detectors used to secure the network and transport layers. As they consist of normal URL requests, flood attacks are difficult to distinguish from normal traffic. Moreover, attacks designed to steal data can be protected by layer 7 protection.

DDOS ATTACK IN INDIA

There has been a 30 fold increase in DDoS Cybercrime in India from the past year, says the report. Cyber security analysts at Tata Communications said that at first attackers targeted few broadband providers, now the pattern has emerged and targeted multiple ISP’s & Broadband providers simultaneously.

As section 66-F of The Indian information technology act of 2000 says that(If a person denies access to an authorized personnel to a computer resource, accesses a protected system or introduces contaminant into a system, which has the intention of threatening the unity, integrity, sovereignty or security of India, then he commits cyberterrorism. Hence, DDoS attack in India is illegal and can take you to jail.



Flowchart of a successful DDoS attack

USE OF IOT TO UTILIZE *Electricity Efficiently*

Aashtha Sharma, Shreya Shetty, Raksha Shetty (SE ELEX)

The power industry is the foundation of the industrial world as it supplies vital energy to commercial, industrial, manufacturing, and even residential customers. As a constantly growing industry, it faces a significant challenge in meeting the ever-increasing demand for electrical power. It is predicted that global energy consumption will increase by 40% over the next 25 years. Therefore, the electrical power industry is looking for smart solutions to meet this challenge without raising customer prices. And the best solution to this problem is IoT. The Internet of Things (IoT) is a new technology that uses the Internet to connect physical devices or "things." In simpler words an IoT-embedded system can connect different objects via networks, allowing data to be collected from various devices which can be monitored and managed in real-time. In a nutshell, IoT is about devices connecting with one another. Three prominent elements of IoT are: asset digitalization, asset data collection, and computational algorithms to manage the network created by the interconnected assets. All of these elements have the ability to improve the electric power grid's efficiency and performance. In the long run, implementing IoT will allow electric power companies to increase efficiency, reduce unscheduled downtime, reduce costs, and reduce asset risks.

TECHNOLOGY IN USE

In IoT systems, sensors are used to sense and collect data, and through gateways route the collected data to control centers or the cloud for further storage, processing, analytics, and decision-making. In response to the sensed data, a corresponding command is sent back to the actuator installed on the system after the decision is made. There are numerous devices used in IoT which help in conservation of energy. Some of them are mentioned below- IoT smart thermostats are an efficient way to utilize electricity. A smart thermostat is a Wi-Fi-enabled device that adjusts the heating and cooling temperature settings in a home for maximum

efficiency. Many modern IoT smart thermostats offer more features for better temperature control, which can result in even more energy savings. Most smart thermostats have movement detectors, which allow them to detect when family members are present and active. They can learn when the house needs to be cooled or heated over time based on your family's movement patterns, and they can even use this data to adjust a heating and cooling schedule. Furthermore, digital thermostats enable users to track their energy usage by creating a home energy profile, which reveals the user's energy usage, how it has changed over time, and how it will affect future costs.



Another example of IoT for energy efficiency is smart lighting systems, which can be controlled based on schedules, motion, or sound to turn on and off as needed and avoid excessive lighting energy use. Wi-Fi-enabled LED lights, which already offer significant energy savings, can be controlled based on schedules, motion, or sound to turn on and off as

needed. Often even when no one is present, rooms in homes, office buildings, and commercial facilities are frequently left lit throughout the day, resulting in significant energy waste. With the help of smart lighting systems, Businesses and individuals can benefit from more efficient lighting technologies and use the programmable capabilities of smart lighting to reduce the number of times lights are turned on.

Another technology used in utilizing energy is Passive Infrared (PIR) sensors. PIR (passive infrared) sensors, also known as motion sensors, are used to detect infrared light emitted by objects in their environment. By using PIR sensors, the presence of humans inside spaces can be detected. If no movement is detected in the space, the space's light control turns off the light. This way consumption of energy can be reduced.

The use of smart meters can help in utilization of energy in the long run. A smart metre is an electronic device that keeps track of data like electric energy consumption, voltage levels, current, and power factor. It transmits data to consumers for better understanding of consumption patterns, as well as to electricity suppliers for system monitoring and customer billing. It also typically records energy in near-real time and sends out reports at regular intervals throughout the day. This information assists suppliers in customising demand-response programmes and adjusting pricing. Residents, in turn, can use applications to control their electricity usage at a granular level, respond to load changes, and reduce energy waste.

ADVANTAGES

IoT-based energy management systems offer numerous advantages to all parts of the supply chain network, including electric utilities and consumers. The traditional energy-management system would collect a sample of energy usage at an interval. The traditional system is good for gathering energy consumption data, but it doesn't help with alerts in the event of spikes, curating usage patterns, forecasting seasonal demand, or recommending appropriate configuration. Real-time alerts, the ability to predict energy demand, usage patterns, and ways to optimize energy consumption are all advantages of the Internet of Things. Furthermore, a well-designed IoT system can not only track energy consumption at distribution points throughout a smart factory, but it can also track energy consumption all the way from the source to the consumption point using smart meters. An IoT-based monitoring system gives early warnings of electric motor vibration/temperature problems. The unnecessary stress of performing emergency repairs can also be avoided. Machines can communicate with each other without human intervention, resulting in faster and more timely output. This lowers labor costs. Another major advantage of IoT is that,

machine-to-machine interaction improves efficiency, allowing for faster and more accurate results. As a result, valuable time is saved. It allows people to do other creative jobs instead of repeating the same tasks daily.

DISADVANTAGES

But The use of IoT has some drawbacks as well. One major disadvantage of IoT is loss of security and privacy. As technology has progressed, any user's data can now be found on the Internet. This has created an opportunity for hackers to quickly and easily locate their prey. They can easily hack the network and gain access to the users' personal information. However, Cybersecurity firms are working on it, and several protocols have been implemented to keep the network safe from hackers. Also, there are many protocols under processing to overcome this issue. Second disadvantage of IoT is that companies have begun to use IoT devices more than employees. As a result, a large number of people are out of work. Things are getting more automotive so the people who do not know how to use the technology are also losing their jobs. Low-skilled people are greatly suffering from the advancement of IoT. It is predicted that in the future IoT will have more grip on the field and the devices will come with more automotive features. The government along with companies must introduce some steps that would eliminate unemployment so that people can earn their livelihood. Also we conducted survey responses of which are shown above.



Although IoT has a number of drawbacks, the benefits of saving consumers time and money cannot be overlooked. In the field of energy, IoT technology offers a plethora of possibilities, which means more convenience in your life. IoT will take relationships with power to the next level. It has the potential to significantly transform the electric power industry. IoT can improve asset reliability, reduce operational costs, and eliminate unplanned downtime by combining post-time and real-time data with analytics, allowing electric power companies to achieve higher productivity.

FOREST LAND FOR ZERO *Carbon Emissions*

Ramesh Patel, Yash Pawar, Sakshi Porwal (SE ELEX)

We have noted the pledges made by some countries to achieve Net Zero GHG emissions or carbon Neutrality by or around mid century. However, this may not be adequate in view of fast depleting available carbon space. Therefore and keeping in view, the legitimate need of developing countries to growth, we urge G20 countries to commit to bringing down per capita emissions to Global average by 2030, said the Indian statement .

The Net Zero emissions refer to a situation where a country is able to remove at least as much carbon dioxide from the atmosphere as it is emitting. This can be done by increasing forest cover or through technologies such as carbon capture. India's position as the third largest greenhouse gas emitter but also with among the lowest per capita emissions means that it has always resisted a hard deadline – some countries have set their target years as 2050 or 2060 – to commit to a net-zero future. It is expected that the forthcoming COP 26 talks in Glasgow will see a commitment by the United States.

India's NDC requires it to achieve three main goals including increasing cumulative electricity generation installed capacity from non-fossil sources of energy to 40% by 2030, which currently stands at around 38%; lower emissions intensity of its GDP by 33-35% compared to 2005 levels by 2030 and create additional carbon sink of 2.5 to 3 billion tons through additional forest and tree cover. Within this is included a commitment to install 175GW of renewable energy by 2022 comprising 100GW of solar, 60GW of wind, and 10GW of bioenergy, and 5GW of small hydropower projects.

PM Modi has claimed to increase the targeted 175GW by 2022 to 220GW and also claimed to install 450GW of renewable energy by 2030. If India were to achieve this, the share of installed capacity of non-fossils in India's electricity mix would reach 65%. In comparison, India's Paris agreement target is to reach 40% non-fossils by 2030.

India would focus on implementing its “ambitious

plans” through concrete actions domestically as well as globally via collaborations such as the International Solar Alliance and the Coalition of Disaster Resilient Infrastructure, Union Environment Minister Bhupender Yadav said at the conclusion of the summit.



Effects of Carbon Emission in India

WORLD'S STRONGEST *Currencies*

Athira Aravind (SE ELEX)

The United States and several other countries use the US dollar as their currency. Most central banks and commercial banks around the world hold it as the world's major reserve currency. Because of its broad use, the US dollar accounts for approximately 88.3 percent of daily foreign exchange trades.

Both Switzerland and Liechtenstein use the Swiss franc (CHF) as their official currency.

The Swiss franc is the first currency to have a higher value than the US dollar, with 1 US dollar buying roughly 0.98 Swiss Franc. This is unsurprising, given that Switzerland is one of the world's most stable and prosperous countries. Along with the USD and JPY, it serves as a safe haven currency for investors during times of economic uncertainty.

Due to its stringent monetary regulations and low debt levels, the Swiss franc is also the world's seventh most traded currency. It has gained a reputation as a safe bet whether trading or keeping currency.

The Euro, or EUR, is one of the newest currencies, and it is the official currency of 19 countries, making it the world's most extensively used 'official currency.' Germany, France, and Spain are among the countries that utilise it as an official currency, and it is sometimes referred to as the world's second reserve currency. It's also the second most traded currency on the foreign exchange market, trailing only the US dollar. In fact, the EUR/USD, often known as the 'Fiber,' is the world's most traded currency pair, accounting for about a quarter of all daily forex deals.

The Cayman Islands dollar, or KYD, is the world's seventh most costly currency. It is the native currency of the Cayman Islands. The Cayman Islands, an autonomous British territory in the Caribbean, are a major financial tax haven for affluent individuals and corporations.

Gibraltar's native currency, the Gibraltar pound, or GIP, is exchangeable at face value with the British pound sterling. As a result, you can use both GIB and GBP in Gibraltar.

The Great British pound, sometimes known as the pound sterling or GBP, is the world's fifth most valued currency. Although the GBP is not the world's strongest currency, it does hold the distinction of being the world's oldest currency currently in circulation.

Jordan's national currency is the Jordanian dinar, or JOD, which is now ranked as the world's fourth most powerful currency. The currency became Jordan's national currency in 1950 after it replaced the Palestinian pound.

Oman's national currency is the Omani rial, abbreviated OMR. The Omani rial, unlike most other currencies, is divided into 1000 smaller portions known as baisa. Due to the strength of Oman's oil exports and its peg to the US dollar, the Omani rial immediately appreciated in value after its introduction.

The Bahrain dinar, or BHD, is the world's second most powerful currency. It is divided into 1000 smaller monetary units, called 'fils' in this case, as are other Arabic currencies on this list. The Bahraini dinar is a local currency that is tied to the US dollar.

The Kuwaiti dinar, or KWD, was launched in 1960 and was initially equivalent to one pound sterling. It is known as the world's strongest currency. Kuwait is a small country wedged between Iraq and Saudi Arabia, whose income is entirely based on oil exports to the rest of the world.

EMERGENCY

Contraceptive Pills

Prachi Rai (TE ELEX)

N emergency contraception is a type of contraception that could be used to prevent unwanted pregnancies following a sexual encounter. These should be used within 5 days of the act of intercourse, but the earlier they are used, the more effective they are.

By creating a chemical alteration in egg and sperm before they meet, the copper-bearing IUD inhibits conception.

To avert an unplanned pregnancy, any woman or girl at reproductive age may require emergency contraception. The use of emergency contraception has no absolute medical contraindications. The use of contraceptives has no age restrictions.

WHO CAN USE IT?

Women and girls can resume or begin using a regular form of contraception after using ECPs. There is no need for extra contraceptive protection if a copper IUD is being used for emergency contraception.

Women and girls can resume their current contraceptive method or start any contraceptive technique, including a copper-bearing IUD, after receiving ECPs containing levonorgestrel (LNG) or combination birth control pills (COCs).

On the sixth day after using ECPs using ulipristal acetate, women or girls can restart or begin using any progestogen-containing technique (whether combined hormonal contraceptives or progestogen-only contraception). If it is verified that they are not pregnant, they could have an LNG-IUD put right away. The copper IUD can be implanted right away.

KNOWING THE SAFETY

ECPs have side effects that are similar to that of oral contraceptives, including vomiting and diarrhoea, minor sporadic vaginal bleeding, and exhaustion. Side effects are uncommon, moderate, and usually go away without the need for additional medicine.

If you vomit within 2 hours after taking a dose, you should take it again. COCs are preferable to ECPs with

LNG or UPA because they induce less morning sickness. Antiemetics should not be taken on a regular basis before taking ECPs.

Emergency contraceptive drugs have no effect on future fertility. After taking ECPs, there really is no delay in resuming fertility.

However, some women take ECPs on a regular basis for any of the reasons mentioned above, or as their primary method of contraception and emergency contraceptive pills price varies accordingly. In such cases, additional counselling on other, less regular contraceptive options that may be more appropriate and effective should be provided.

ELIGIBILITY CRITERIA

For women with medical eligibility requirements (MEC) class 2, 3, or 4 for combined contraceptive pills or progestin-only contraceptives, frequent and recurrent ECP use may be detrimental (POC). Although there are no known health hazards associated with using emergency contraception frequently, it can cause more adverse effects, including such menstrual abnormalities.



Popular Contraceptive Pills

BLUETOOTH *Earphones*

Aashi Shrivastava (TE ELEX)

So you've decided it's time you ditch the wires and go wireless with your headphones. You've probably done some research and discovered that not all cordless headphones are created equal.

However, the more you investigate it, the more perplexed you become. This is especially true when you hear about other wireless headphones options outside Bluetooth, such as broadcast, infrared, and Kleer. You're now faced with the decision: which should I choose?

The main distinction is in the way the headphones are connected to a media player.

WIRELESS HEADPHONES can employ RADIO SIGNALS, INFRARED, INTERNAL STORAGE, OR KLEERNET to send audio signals, WHEREAS WIRED HEADPHONES USE BRIEF RADIO WAVES.

You're probably aware of how headphones work: they use a cable to amplify and transform the audio signal from a media player (such as your phone or laptop) into the lovely sound you hear.

Wireless headphones eliminate the need for a wire by sending sound via low-powered radio waves. This procedure necessitates the use of two devices: a transmitter (such as your smartphone) and a receiver (such as your computer)

RF HEADPHONES

RF headphones use a particular radio wave frequency to transmit sound. As a result, in order for RF headphones to work, they usually require a specific dongle/transmitter. This isn't as simple as Wireless headphones, which are built into nearly every current device.

RF headphones, on the other hand, can broadcast through buildings and solid matter (unlike most Bluetooth devices), hence signal loss is nearly non-existent. In addition, RF headphones require little audio compression, which indicates two things:

To increase content immersion, RF headphones generally incorporate audio settings such as sound system and bass boost. Certain RF headsets & transmitters can support audio sharing, hence why RF earphones are ideal for group sound experiences such as silent discos and watching TV with pals.

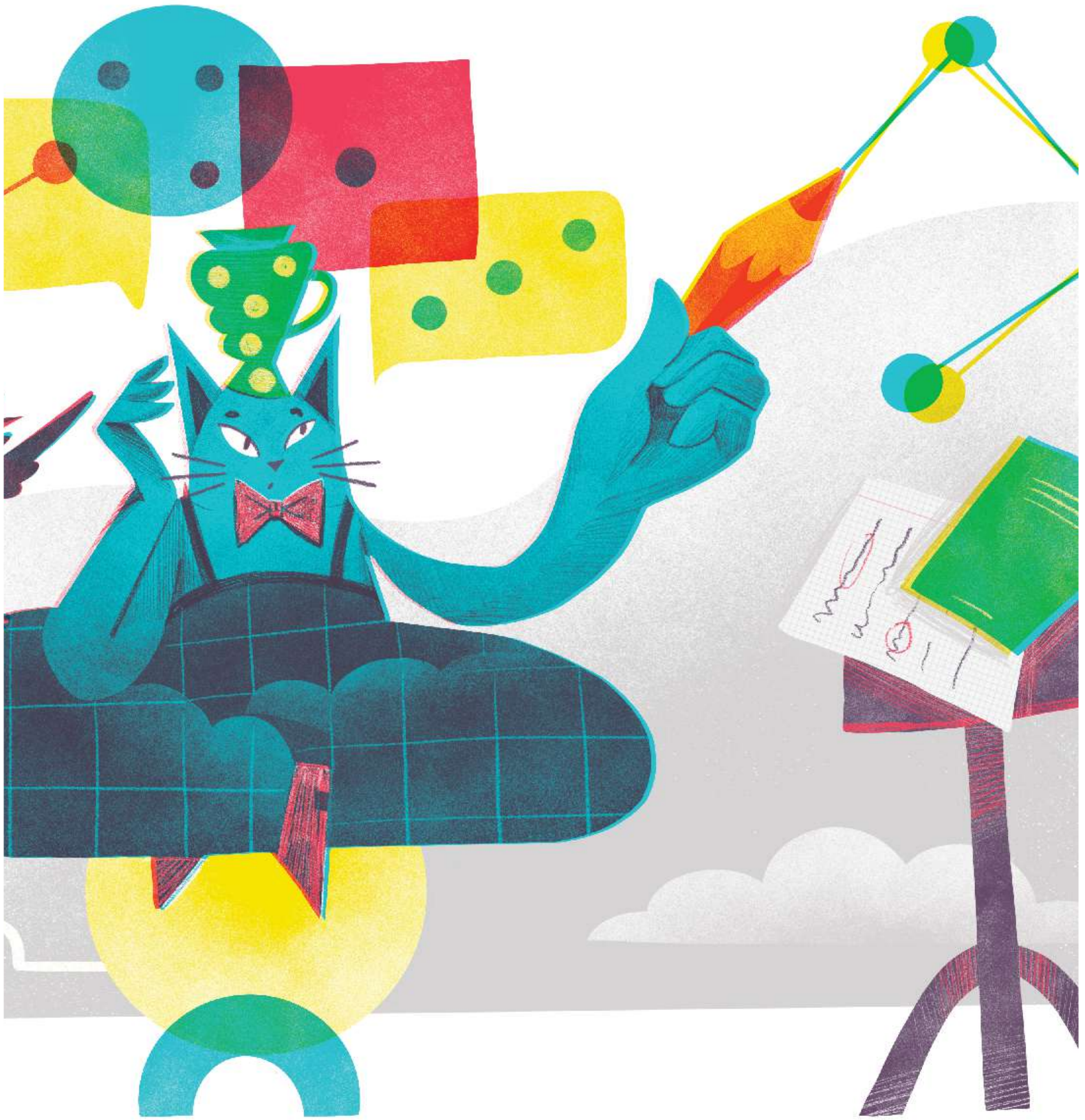
IR HEADPHONES

A dock station that interfaces to the audio stream is usually included with IR headphones. However, unlike RF earphones, IR transmitters provide the sound wave to the headphones via light-emitting diodes (LEDs) rather than radio waves.

IR headphones require a line-of-sight (LOS) contact between both the transmitter and your earphones because they employ lightwave. They do, however, have a decreased chance of interfering with the other wireless devices that can degrade sound quality.

While certain infrared headphone versions are still available, their popularity is fading. This is that one of the most appealing features of Bluetooth earphones is the ability to move away from the source of audio. Unfortunately, the short range of IR prevents this.





Artwork by tubik.arts

RESEARCH PAPER

The worldwide pandemic has increased the rate at which companies are bringing new ideas to market, and prioritizing innovation today is the key to unlocking post-crisis growth. Students from the ELEX department developed and explored their unique ideas throughout the pandemic. You can find summaries of these research papers in this section, and if you want to read the entire paper, you can scan the code attached to the article to read it in its entirety.

PORT ARCH LINUX TO ARM INSTRUCTION SET ARCHITECTURE



PRITIKA GHARAT

SHANTANU KUDAV

GAURANG VISHWAKARMA

The main objective of this project is to provide a business to business (B2B) and business to consumer (B2C) solution for companies developing hardware (laptop/desktop) consisting of ARM processors. Such an operating system can enable cross platform system integration as ARM processors are very flexible and we have seen how well some large laptop/desktop manufacturing companies use these processors. For seamless integration of these functional modules an x86 inspired OS has to be ported on these ARM based CPUs. Our goal is to provide such projects with an operating system built for such processors. Our OS can be customized according to the hardware specifications mentioned by the company. The basic aim of the project is to Port Arch Linux on an ARM SBC. The different types of ARM ISAs that can be used

are Raspberry Pi 4B+, Banana Pi, Orange Pi, BeagleBone xM, with Cortex A7. In our case, we'd be using Raspberry Pi, and port Linux to the same. Processors of x86 are highly expensive and unnecessary for carrying out simple tasks, or using light software. The idea behind the implementation is to create an accessible product that can be used by those people who need a laptop, but only for low end tasks.

IMPLEMENTATION

Step one of the project is to recompile: Kernel (Linux), Init (systemd), Bootloader (GRUB), File System (ext4), Shell (Bash), Display Server (XORG), GUI Framework (Qt), Display Manager (SDDM), Window Manager (kwin), Desktop Environment (plasma), Network Manager, Open SSH and their dependencies in a way that's convenient for porting Linux to an ARM SBC. Arch Linux would be used for that purpose. We will be cross compiling all of the above on an x86 computer. All the

compiled packages will be stored in a local database and linked to package manager (pacman) in /etc/pacman.conf

The step two of the project is to connect all the Peripherals to the ARM processor-based SBC. Peripherals like Keyboard, mouse, etc would be connected to the RISC. The subsequent step would be to boot the OS on our target ARM SBC. The term "booting" is short for "bootstrapping", which refers to the process by which a computer prepares itself to load an operating system.[7] The communication between the peripherals and the ARM SBC would be done with the help of the booted OS, which contains the Kernel that has interacted with the modified Bash script. We'd also be using Bash scripting to communicate with the Kernel,

which in turn would help in starting the init system. The reason it is crucial to use Bash for the Kernel is because the init system would help us in the execution of further steps of our project. Considering the business model, Step one and two can be modified depending on the type of ARM SBCs we are using.

- Arch Linux OS installed on x86 computer (for cross compiling packages, build, dump)
- Tools on Arch Linux OS for example compilers, Linux shell, interpreters, and other tools like squashfs creator, etc.
- ARM SBCs which may include Raspberry Pi 4B+, Banana Pi, Orange Pi, BeagleBone xM, with Cortex A7 or better processor.
- Peripheral devices for interfacing. Keyboard, mouse, monitor, Wi-Fi dongle(optional).

RESULT AND FUTURE SCOPE

The result would include creation of a model with an ARM SBC that works on Linux. This ARM SBC (Raspberry Pi in our case) is connected to peripherals like monitor, keyboard, mouse etc. This helps in the ultimate functioning of an SBC as a computer and hence, helps in the functioning of low-end tasks. This model can be successfully implemented as a B2B model as well as a B2C model. The product can be used by individual consumers for their personal use, like carrying out simple tasks and running simple software. For people implementing low end tasks, a mainstream laptop/desktop can prove to be way too expensive. The idea behind the project is to come to a middle ground and come up with a niche product that isn't too miniature sized like a mobile phone, and at the same time isn't as complex as a laptop/desktop.

At the same time, the model can be implemented for the industries and can be used for operating their own personal system, or machine, that is used for industrial purpose, and doesn't require an x86 processor computer. The business model can be further upgraded by taking orders and creating personalized ARM SBCs based on the client requirement. In all the cases mentioned above, the final result comes down to running a desktop/laptop with ARM processor and making it convenient for low end tasks.



```
liveuser@archlinuxgui:~
VOL 68% | BL: 5% us 24% 7% 25°C 100% 19:04

[module/xkeyboard]
type = internal/xkeyboard
blacklist-0 = num lock

format-prefix = "⌨"
format-prefix-foreground = ${colors.foreground-alt}
format-prefix-underline = ${colors.secondary}

label-layout = %layout%
label-layout-underline = ${colors.secondary}

label-indicator-padding = 2
label-indicator-margin = 1
label-indicator-background = ${colors.secondary}
label-indicator-underline = ${colors.secondary}

liveuser@archlinuxgui
-----
OS: Arch Linux x86_64
Host: Vostro 3478
Kernel: 5.13.13-arch1-1
Uptime: 4 mins
Packages: 624 (pacman)
Shell: bash 5.1.8
Resolution: 1366x768
WM: bspwm
Theme: Qogir-dark [GTK2/3]
Icons: Tela-circle-dark [GTK]
Terminal: kitty
CPU: Intel i5-8250U (8) @ 3
GPU: Intel UHD Graphics 620
Memory: 1557MiB / 7816MiB
```

CONCLUSION

Arch Linux was booted on an ARM based processor (in this case Raspberry Pi) which is interfaced properly. Hence, Arch Linux was ported on ARM ISA which is essential for creating a new laptop using the same processor. It will help in reducing the cost of laptops/desktops drastically. The approximate reduction in costs can be up to 40% of the current cost. The devices that can be developed using these processors can be both affordable as well as easy to operate for daily tasks for most people. Any company can have customized designs for their particular specifications. Since this is an open-source project, many more developers can also contribute for a better build of the proposed prototype.

AUTOMATED PRESCRIPTION GENERATION USING NLP



SHRIYANSH SINGH

SHUDHANSHU SINGH

VISHAL THAKUR

SUNIL KHATRI

VIVEK TIWARI

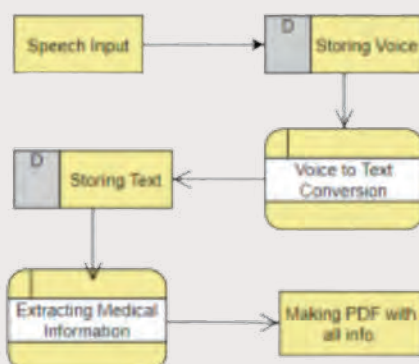
There has been rapid development in the fields of AI, ML, NLP & DL in the past decade and now the work is on to integrate and find better methodologies to improve the current sectors like finance, healthcare, automation, manufacturing, tourism, education & etc. This driving force has led to a myriad of ground-breaking research and advancements in every field. Healthcare is one such field too, which has undergone rapid modernization in terms of data-oriented care giving and research. It has led in the reduction of manpower to maintain the records, reduced human induced errors, provided sophisticated & detailed care given based on the enormous data generated and readily available. A natural course of advancement was in the field of NLP with healthcare, especially the inclusion of transformers for solving problems.

The use of Natural Language Processing (NLP) in the healthcare industry has had its benefits particularly in the domain of doctor patient interaction, prescriptive - predictive analytics, patient and diagnosis oriented detailed care, disease classification & disease detection.

DESCRIPTION

NLP enables information management via the detection of ailment symptoms from scientific notes. those notes comprise unfastened text information from emergency branch admission and discharge, details related to patient allergic reaction, remedy, preceding visits were noted inside the medical records. This looks at includes a massive sample population i.e., over 40,000 and two principal hospitals had participated in the observe. These studies turned into cantered at the identification of not unusual signs accountable for the transferability of influenza cases. The feature(data) extraction process involves natural language processing NLP parser (sample matching and deduction of guidelines) . This system can retrieve the data through enforcing the policies created and providing the matching results. The knowledge capture process is iteration based mostly, consequently, understanding captured data is

constantly up to date and changed consistent with the update inside the domain but there's constantly a danger of error within the know-how replace procedure. This can be prevented through validation and automation of knowledge base via software systems however in the past EHR had been entered manually in the systems that are inclined and have mistaken. Research performed via NLP shows a system proposed as a negation algorithm can extract signs and symptoms said by way of the affected person and match it with documented medical facts & records.



The system consists of an Application Programming Interface (API) which takes audio input from the user and provides a prescription with the necessary information according to the input. The system consists of three parts viz. Speech recognition, Data extraction and the output i.e., Prescription creation. The input is taken from the user via a webpage created using the Flask framework which basically consists of a webpage with a button which when pressed will start recording the user's voice until he/she stops talking. This information is passed on to the speech recognition system for further compilation. The pdf is created using the dictionary as it takes the keys as the column name and enters the data of the corresponding value in each column.

SPEECH RECOGNITION

As the name suggests, it includes the speech-to-text conversion of the data which the user provides. The data is in an audio format which for further work should be converted into text. This conversion is done by using google speech recognition which helps capture the audio from the microphone as well as convert it into text format using the python library viz. `speech_recognition`.

DATA EXTRACTION

This section consists of the extraction of data which is taken from the recognized text from google's speech recognition system. This text is further processed in this section to come up with the desired terms for a prescription. As commonly known, a conversation may consist of a various number of words which are not necessarily required to be added in the prescription. This section deals with the extraction of those terms which provide the most appropriate meaning to medical terms. The spaCy library in Python is used for this purpose as it consists of data libraries which can be accessed and worked upon based on our necessities.

PRESCRIPTION CREATION

This section takes a dictionary as an input and uses it to create a table of contents displayed in a pdf. We use FPDF2 library in python for this functionality with its extended version for creation of tables.

The pdf is created using the dictionary as it takes the keys as the column name and enters the data of the corresponding value in each column. This makes it convenient and accurate in making prescriptions. The output can then be downloaded in the PDF form and can be used as per further needs by the user. AI and NLP algorithms have the competencies predicted to understand patients with complex health conditions who've had a history marked by psychological well-being or substance misuse and need advanced attention. Elements, as an example, nourishment frailty and accommodations precariousness can discourage the treatment conventions, for this reason convincing these patients to result in greater expense in their lifetime. The data of a patient's financial health and demography is regularly harder to situate than their clinical data since it's far greater often than not in an unstructured corporation.

RESULT AND FUTURE SCOPE

The NLP technique aids the knowledge management technique of records capture valuable information and extract through specialized tools such as concept extraction primarily based textual content evaluation device (CETAS) for idea identification and extraction in step with different software inclusive of named entity recognition (NER) and conditional random fields (CRF) had also been implemented. The NLP methods helps in data management for validation or assessment of information captured vs. understanding documented. The ones to verify & create the clinical information device such as EHR are human, and human are greater inclined toward mistakes this trouble is addressed and solved through NLP negation set of rules which compares the patient said signs with facts which are documented. We identified that majority of the research had followed a few sorts of quantitative measures to compare,

assess & examine their studies with either previously carried out similar research models or comparing research with the identical data having two splits - train and test records, or to set up a brand-new milestone with completely new methods or a hybrid version. The research studies had compared their overall performance of two primary evaluating degrees - precision-recall matrix and sensitivity and specificity matrix. The respective matrix has a similar concept of accuracy calculation however the representing terminology differs. It relies upon the researcher's desire which one they want to adopt.

CONCLUSION

In this paper, we introduced how we can use Med7 which is a part of SciSpacy that is popularly used for extracting named entities. Named Entity Recognition (NER) plays an especially important and crucial role in identifying relations between the texts, opinion mining, extracting names, just to name a few. This Med7 model is trained on more than 2 million patient's text from MIMIC-III corpora which was then followed by fine-tuning on identifying the entities in the text. Our project involves Natural Language processing over clinical data where we are trying to extract named entities which are medical terms such as duration, route, quantity, period, etc which are common terms mostly used by doctors in their day-to-day life while communicating with the patients. SciSpacy is fast, and easy to use, and it is contributing a lot in the processing of biomedical clinical texts.

SMART HOME AUTOMATION



AASHTHA SHARMA

ADITYA SHANDILYA

INTRODUCTION & IMPLEMENTATION

Energy has been the driving source for human development since the dawn of human progress. From using raw natural sources of energy such as fire to harnessing electrical energy with the use of modern gadgets, energy has proved to be the x-factor and plays a very vital role in developing any civilization. However modern civilizations are complex and thereby require more and frequent use of energy sources. This creates the problem of source scarcity as the traditional sources of energy such as fossil fuels are exhaustible and are expected to get exhausted in the decades to come. Even though an attempt to utilise

inexhaustible sources of energy has been successfully made, traditional sources cannot be directly replaced. Efficient use of energy and monitoring daily energy consumption for analysing and planning a roadmap for energy usage thereby becomes important. With the developments seen in IoT technologies smart home solutions to minimise energy wastage and optimise energy usage are available.

Every technology requires a team of skilled individuals who are well-versed in the network, hardware, software, and technology. Although India is backward in this regard, people believe that as technology spreads, they will lose their jobs and that there will be no life for new technology. As a result, they take no action to learn more about it. As a result, every organization faces numerous

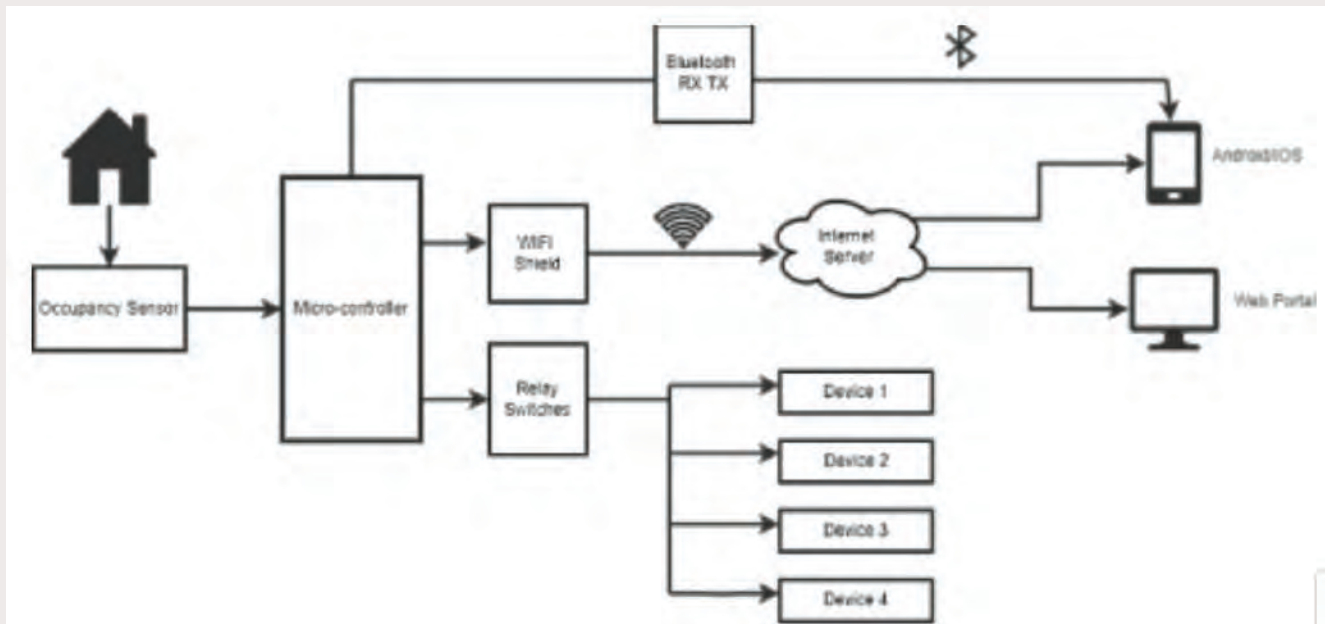
challenges as they transition from legacy systems to IoT-enabled systems. Similarly, in India, scalability, fault tolerance, and power supply are major challenges. The main objective of this paper is to analyse and explain the development model of an IoT-based home automation solution using Dual Technology Occupancy Sensors, Microcontrollers, and Wireless Sensor Networks (WSN). The user can gain control of smart sensors and sensing infra via wireless communication technologies and can control consumer smart home appliances such as smart lamps, smart fans, smart TVs, etc with the help of a mobile application or a web portal.

Most of the currently available home automation systems face security issues and also the problem of efficient manageability. The objective of this paper is to lay the foundation for the mobile phone-based application for home automation that we plan to realise in the coming future. Existing, deep-rooted systems are based on wired communication. Examples include BACnet, LonWorks, and KNX [1]. Utilising a typical wired automation system does not pose a problem as long as the system is planned before and installed during the physical construction of the place. However, already existing buildings should be supplemented with automation systems, which requires much effort and many costs since cabling is necessary. Obviously, wireless systems can come to help here [1]. In the past few years, wireless technologies have been developed. Wireless based systems, used daily and at every place, range from wireless home networks and mobile phones to garage door openers. As of now, little relative

The software design of the home automation system can be divided into two layers, the microcontroller firmware and the user interactive software systems such as mobile applications and web portals.[4] The user interface interacts with the user whereas the firmware created using an integrated development environment (IDE) such as Arduino IDE interacts with the microcontroller. After compilation, the executable firmware is loaded into the ROM of the microcontroller using an electronic programmer. The web portal can be designed using HTML, CSS, JavaScript, and a server-side web application framework like asp.net. The web server contains commands that control the home automation system and can be accessed using any web browser. These commands are relayed over to the microcontroller using WiFi technology. Web technologies such as AJAX can also be used for outputting real-time data on the website after the sensors transmit the data back to the web server.

research of wireless automation standards has been done. Home automation systems face four major challenges [2], these are high cost of ownership, inflexibility, poor manageability, and difficulty achieving security. Nevertheless, most of the approaches proposed to date only provide partial solutions to the overall problem of energy efficiency, where different factors are involved in a comprehensive way, but until now have been inscribed separately or even neglected by preceding proposals. This division is regular due to the uncertainty and lack of data and inputs included in the management operations, so that analysis of how energy in

homes is consumed is incomplete. Implementation of such home automation systems can be extremely useful for managing energy efficiency and reducing power wastage. Smart home applications depend on highly sensitive information, which requires privacy, integrity and authentication support. The same data could be requested by different consumers which are located in different administrative domains; thus, we aim to get strong security support to protect information independently from the channel.



RESULT & DISCUSSION

Following the control logic, various requirements such as low power operation and multiple sensor support can be met. Similar results are expected to be obtained for more general deployments with a wider doorway or larger area by using higher-resolution sensors with an appropriately selected field of view. Our proposed model helps us to handle the case of more than one object entering the scene at the same time, which is an open question for most of the existing occupancy detection solutions. All the data regarding energy utilisation and energy saved (past and present) can be easily monitored from users' personal devices.

CONCLUSION

In this paper we have proposed a design for a home automation system that will help in minimization of energy utilization by monitoring, controlling, and alerting the energy consumption/utilization without privacy concerns. The developed model advances the state-of-art by overcoming multiple challenges including accuracy, energy efficiency and privacy prevention, etc. By authorizing users with near real-time information of their energy consumption, the intent is to help consumers use energy more efficiently and also to minimize their personal impact on the environment.

PLASTIC EXTRACT MATERIAL FOR 3D PRINTING



SHANTANU KUDAV

JANANI MENON

SWATI KHANNA

DHARMIK MISTRY

SARVESH KHETAWAT

ROHIT KAMAT

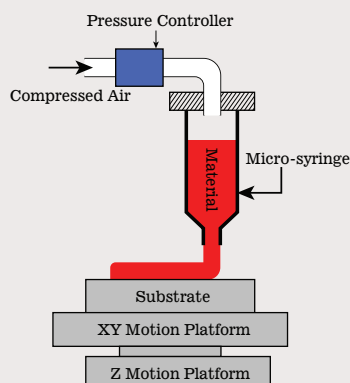
Thermoplastics are a desirable material with a vast variety of processes like Injection Molding, Laser Engraving and 3D printing. Production of plastics has escalated annually and is projected to increase to close to one billion tons in the year 2050. The sheer volume of production, in addition to the historical remnants of previous year's production is leading to unprecedented challenges with respect to the management and reuse of this resource. Solutions to this growing problem would require a more robust management process of this resource, which takes a holistic view, enabling recycling from the product design phase right through to waste processing to prevent plastics unnecessarily being destined for landfill or littering our environment. Additive Manufacturing has proved to be a highly disruptive process, even though the application of Additive manufacturing is skyrocketing.

Of all the available technologies, the widely utilized and accessible method is FFF (Fused Filament Fabrication) and it utilizes PLA and ABS plastics. It is found that most of the ABS plastic found in such materials is thrown away as waste. It can therefore be reused and recycled to be used as a feedstock material for 3D printing.

DESCRIPTION

An experiment was conducted to compare the ABS waste plastic with virgin plastic to compare its quality and durability. It was found that the degradation of mechanical properties was reduced only by a percentage as low as 13%. This implies that there is considerable potential for ABS plastic to be reused in functional applications where mechanical integrity is required. The biggest advantage here was that it enhanced material reuse with extremely low carbon footprints. It entails recycling waste plastics found in consumer waste into 3D printer filaments, while renewable energy is used to power the apparatus. To test the efficiency of the prototype system, in this study it was demonstrated that ABS found in electronic waste can be taken and granulated down using a hand

operated grinder, before using this in a melt extrusion process to generate 3D printer filament. Then the filament can be used to create 3D printable items, including a functional pipe connector part using energy generated from a solar energy generation system (Nano Grid). The preliminary tests confirm the functional operation of the system and its potential to revolutionize the current paradigm of aid delivery, through a more versatile approach that not only works sustainably, but boosts advantages of product offered by AM.



3D PRINTER

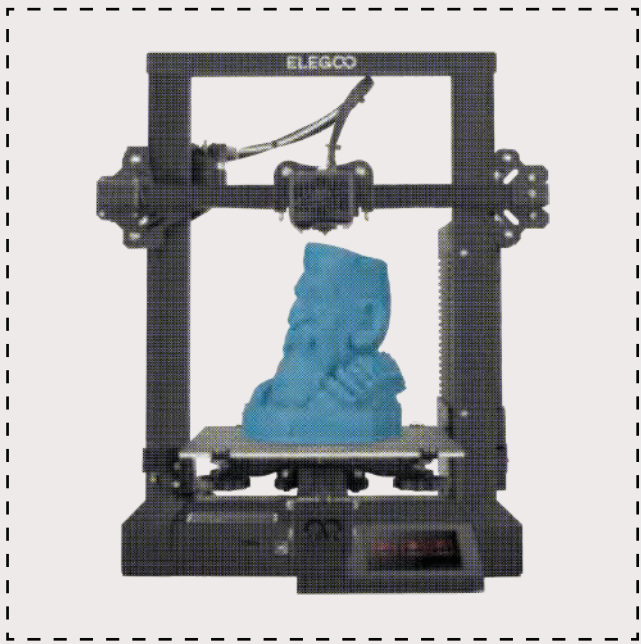
All 3D printer testing and modifications were performed to a commercially available FFF machine Lulzbot Mini. This format was selected due to the open source nature of the printer, both with respect to software and hardware, which allowed for modifications to be made with relative ease. The printer was also selected as it was found to be a good compromise of 3D printing size, to power consumption, as assessed from in-house testing. For use in this study modifications were made to the printer to both allow for usability using the Nano Grid system and also using recycled plastics.

CONSUMER WASTE COLLECTION AND GRANULATION

The ABS plastic from consumer waste was reclaimed for test material. The plastic was collected from old desktops, laptops and telephones. Most of the plastic found was free from contamination, but the ones that did, required light cleaning by a damp cloth to remove dust and dirt. The plastic components were broken down in small fragments of 15 cm diameter and then inserted into a hand operated granulating machine where the fragments were broken down to a size of 5mm, which could be served as a filament for the extrusion process.

FILAMENT EXTRUSION

To convert the waste plastics into 3D printer filament, a melt extrusion device was created which served as the core element of the recycling system. The system was based on key elements from commercial melt extrusion systems utilizing a single screw system. The system was internally geared by a DC motor. But, a secondary mode of operation was created using Nano Grid, which would be displayed further in depth. An encoder was used to keep the rotational velocity constant. The screw is coupled directly to the geared motor, which provides a simple and convenient interface where chains are not required. Three individually controlled 50W band heaters are used to vary the temperature distribution along the barrel, to control how the fed waste plastic transitions from solid to the liquid phases. During operation, the motor will rotate the screw, forcing the processed material along the barrel and out through the nozzle. Following extrusion system contains a cooling fan to enhance thermal relaxation. In the current set-up, a 3mm nozzle is used.



NANO GRID SYSTEM

One of the most essential methods for environmental conservation is the generation of electricity from renewable energy. Keeping this in mind, photovoltaic solar panels would be used which would be used to trickle charge lithium ion batteries. In an ideal scenario, the system was aimed to have the capacity to operate solely from the use of the energy generated by the PV's. This would not be realistic in real operational scenarios and so the aim was to create a dynamic system that could operate directly utilizing the energy from the PV cells, and divert excess charge to the lithium-ion batteries. Conversely, in times when insufficient electricity is 84 generated to power a respective device, charge from the battery system can be utilized to sustain operations. An additional fuse and switch were placed into the system as a secondary safety precaution. This would allow for both devices to function in what was termed as 'on grid', using mains electricity, or 'off grid', using the Nano Grid system. The following figure shows a brief explanation of the entire process

CONCLUSION

This study has conclusively demonstrated the Eco printing principle, whereby we realise a low carbon footprint means of recycling consumer waste using 3D printing technology. We have demonstrated that electronic waste can readily be processed using a relatively simplistic process into 3D printer filaments, which can then be used to manufacture mechanically robust parts, such as pipe connectors. The extruder system has demonstrated not only the capacity to convert e-Waste into 3D printer filaments, but can do so with minimal source material to generate filaments. We have also demonstrated the potential of the Nano grid to not only power the 3D printing equipment in real time, but to generate excess energy to charge the systems batteries. We believe with the use of the battery storage system; we can sufficiently supplement the charge generation capacity of the system to allow for indefinite use of the system within reasonable daily usage timescales. However, we have found that the energy generation capacity of the Nano grid system shows considerable fluctuation on a day to day basis. Therefore, further testing of the system is required to better understand energy generation variances over different operational conditions. Finally, we have successfully tested the ability to 3D print parts with the generated waste plastic filament in 'off grid' circumstances. We therefore believe that the EcoPrinting system holds considerable promise as a tool for manufacturing with waste plastics in remote, 'off grid' settings. We hope in future studies to test the principal in actual field tests to better assess the potential of the system.

SOLAR ENERGY IN OPTIMISING RAW ENERGY USAGE IN FABRICATION



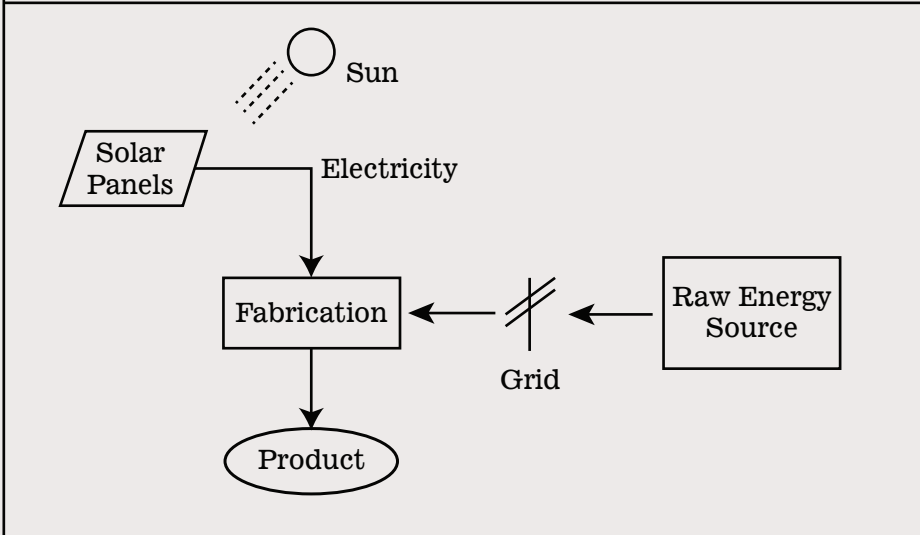
VISHAL THAKUR	VIVEK TIWARI	NEHA VINAMRA	TEERTHRAJ VERMA
	GAURANG VISHWAKARMA	KAUSHAL VISHWAKARMA	

Fabrication in simple words can be defined as a process in which the fabrication industries manufacture semiconductor or Electronics Chips. Fabrication industry can broadly be categorized as a microelectronics industry and fabrication in a complete manner has transformed the microelectronics industry right from chip manufacturing to the production of semiconductors. The introduced system is about the use of solar energy for the fabrication of the chips and semiconductor the purpose of optimization of energy by changing it with

solar energy as it will reduce the cost of manufacturing of the chips up to the great extent and it will also help us to conserve the nonrenewable sources of energy. Though it is not possible to replace the traditional sources of energy completely with the solar energy in manufacturing of chips, even replacing it the industries can save huge amounts of money and thus maximize their profits. Solar energy can be simply termed as the technology which is used to harness the sun's energy and convert the harnessed energy into electricity that can be used to power homes, businesses, and industry. Industrial Solar Power Systems have grown in popularity in India and around the world in recent years, owing to significant enterprises

turning to solar power to avoid grid outages. With free access in most states, industrial solar power systems are rapidly being employed by the textile, cement, paper, steel, chemical, dairy, and ceramic industries to reduce electricity costs and so maximise profits while also working to improve product quality. Heavy peak usage & large available area make solar a perfect energy solution for industries. The high load requirement and large available rooftop area compared to commercial and domestic consumers make solar a viable alternative for industries. Using solar energy as an alternative source for energy in fabrication industries in India can help in a more convenient and effective way.

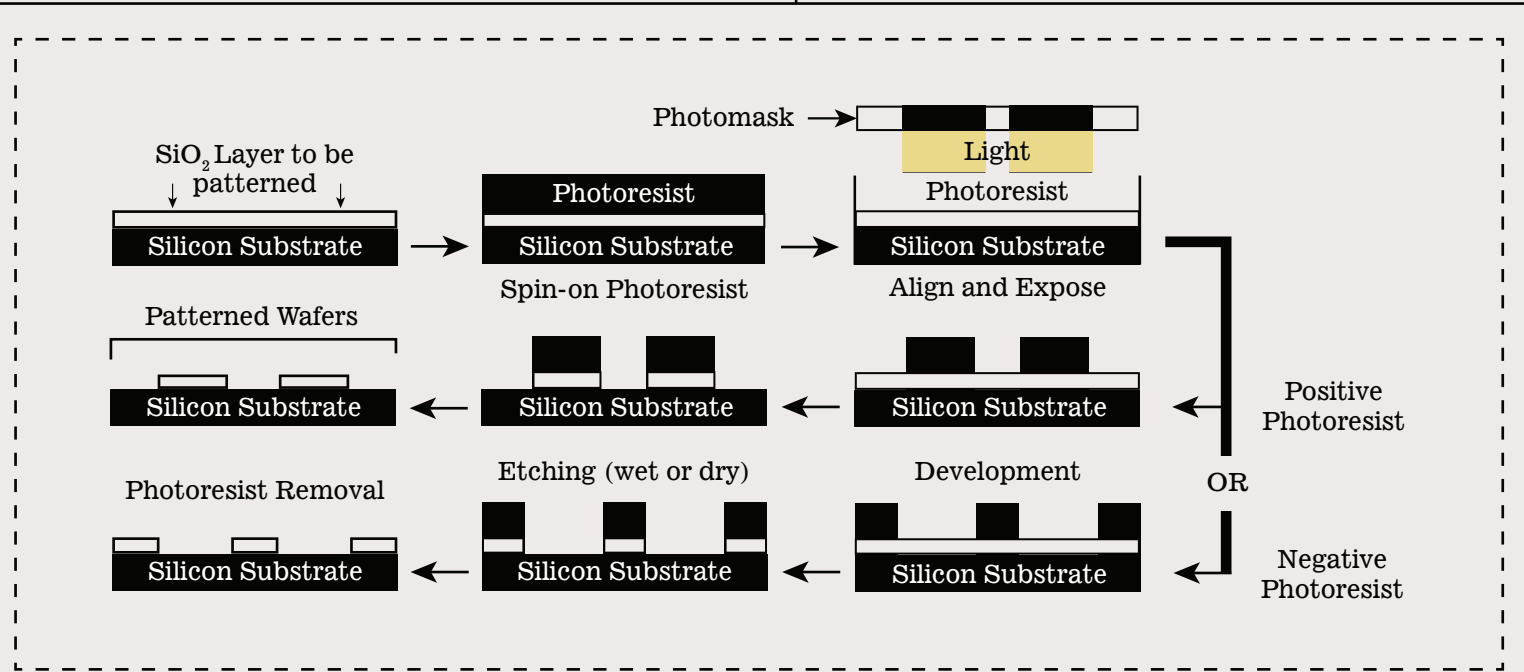
IMPLEMENTATION



The present VLSI fabrication method, which is nearing the physical scaling limit, has gate lengths in the 20-nm range. It suggests that devices will be smaller in size, with a greater number of VLSI chips included. Future VLSI technology will ensure the introduction of innovative device concepts for our future progress. Highly pure single crystal silicon is the material used in integrated circuits. It has the shape of a steel grey solid cylinder with a diameter of 10cm to 30cm and a length of one to two meters, depending on the mould used. The produced crystal is then sawed to produce round wafers with thicknesses

ranging from 400 to 600 micrometers. CMP techniques are then used to clean the surface of the wafer. In general, rather than starting with an ingot, most semiconductor manufacturers use prepared silicon wafers in their designs. Furthermore, silicon oxidation was carried out at high temperatures ranging between 1000 and 1200°C. The etching process is continued to permanently imprint the photographic patterns on the wafer. The final silicon wafer has many finished chips or circuits, with over 10 to 108 transistors and chip sizes of up to ten millimeters on a rectangular side. Chips are tested in the automatic probing station, where defective portions are saved for subsequent identification. Dicing is the process of separating circuits from one another and mounting the good ones in packages. Finally, the package is sealed with epoxy or plastic in a vacuum or inert environment. Several of the processes described above are carried out during fabrication. The operation and ongoing maintenance of all equipment and machinery used, including clean rooms and autonomous

robots, requires a significant amount of electricity. The approximate value is 100MW/H, which is created by relying on raw carbon-based sources, nuclear power plants, or hydropower plants. Solar energy cannot be relied on entirely, but it can be used to generate a portion of the electricity generated. The panel installation is a one-time expense that will be repaid with free electricity for up to 3-5 years. Solar energy, as a renewable source, not only offers free electricity but also lessens grid pressure and thereby protects the environment with no negative side effects. Fabrication firms can employ solar energy as an alternative source for their manufacturing process to reduce chip production costs and assist in the establishment of fabrication operations in energy-dependent countries such as India. Instead of relying on nonrenewable energy sources for electricity generation, solar energy can be of significant assistance in the manufacturing sector.



CONCLUSION

Solar power is a massive source of immediately useable energy that, in turn, generates various energy resources such as biomass, wind, hydropower, and wave energy. The majority of the Earth's surface receives enough solar radiation to allow for low-grade heating of water and buildings, however this varies greatly depending on latitude and season. Simple mirror devices at low latitudes can concentrate solar energy sufficiently for cooking and even operating steam turbines. In some semiconducting materials, the energy of light causes electrons to shift. This photovoltaic effect has the potential to generate significant amounts of electricity. However, due to the current low efficiency of solar PV cells, very wide areas are required to supply electrical demands. Direct solar energy consumption is the only renewable energy source capable of eventually replacing present global energy supply from non-renewable sources, however it comes at the expense of at least 500,000 km² of land area. We can notice several benefits in terms of cost, output, and product quality by substituting solar energy with a traditional source of electricity. Solar energy is also a renewable energy source; thus, it will never run out. Though it is not possible to totally replace traditional electric sources with solar energy in practical and large-scale applications, even tiny amounts of replacement will give significant benefits to the sector.

AUTO BRAKING SYSTEM FOR ROAD IRREGULARITIES



SHANTANU KUDAV

AKSHATA SHARMA

SWATI KHANNA

The main objective is to understand the working of various components together as a whole to form the Auto Braking System. The automatic emergency braking protects against rear-end collisions. If the automatic emergency braking detects that the distance to the preceding or stationary vehicle is becoming critically short at a vehicle speed above 30 km/h (18 mph), it prepares the braking system for potential emergency braking. This increases the safety and efficiency of the vehicle. Automatic emergency braking is an active safety system that activates a car's brakes when a potential collision

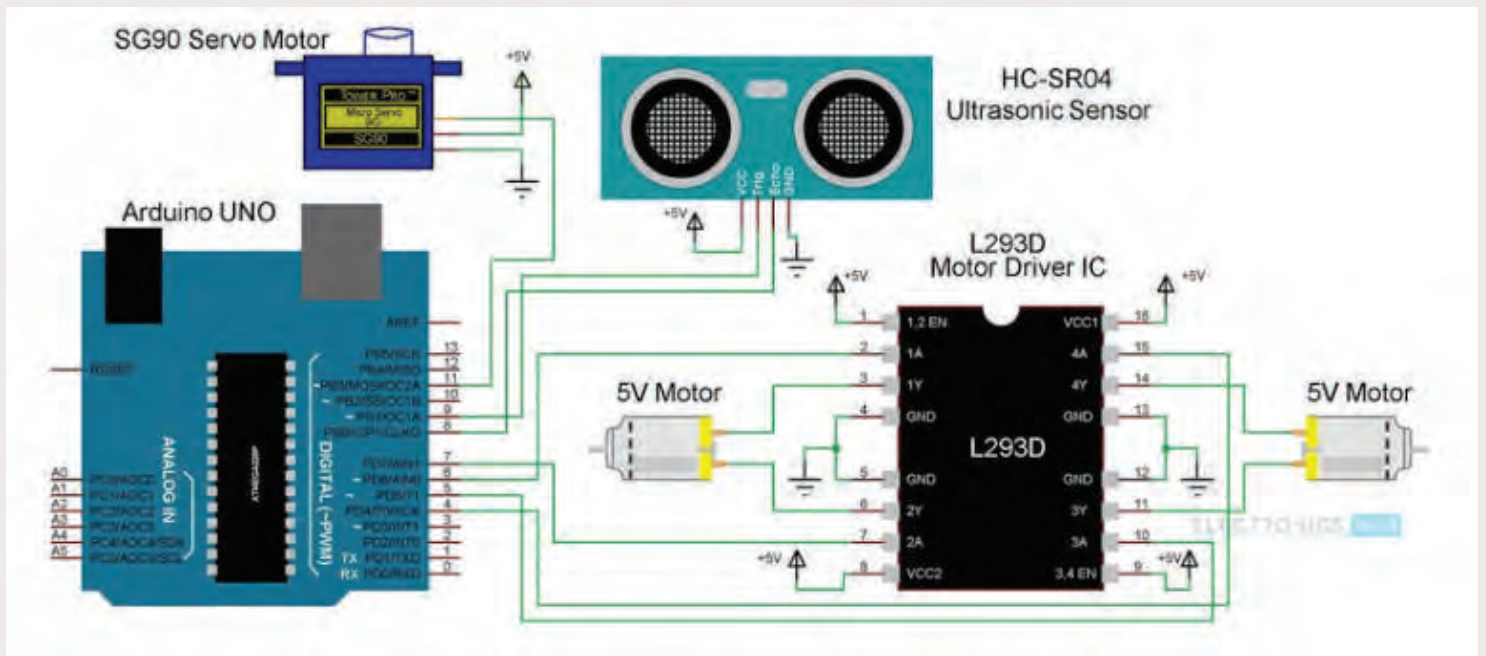
is detected. A significant speed differential may indicate that a collision is likely to occur, in which case the system is capable of automatically activating the brakes. The purpose of AEB is to mitigate crashes by initiating braking when hazardous conditions arise or if the driver brakes insufficiently. If an object is detected, the system can then determine if the speed of the vehicle is greater than the speed of the object in front of it.

IMPLEMENTATION

When the robot is powered on, both the motors of the robot will run normally and the robot moves forward. During this time, the ultrasonic sensor continuously calculates the distance between the robot and the reflective surface. This information is processed by the Arduino. If the distance between the robot and the obstacle is less than 15cm, the Robot stops and scans in left and right directions for new distance using Servo Motor and Ultrasonic Sensor. After the sensor detects an obstacle, the buzzer starts ringing and the motor stops as well, indicating a possible collision.

Along with automatic brakes we intend to add a system that can also control the speed of the vehicle and reduce or increase it according to the obstacle ahead. The detection of objects could be more accurate, as in not just limited to inanimate objects but also, pedestrians, cyclists etc. This is currently a standalone project, but with a few modifications, this can be attached to vehicles without auto braking systems too. This system can't detect an obstacle while turning, which is a feature we intend to add in the future. A monitor can be attached to the system to assist in parking of the vehicle.





RESULT

The proposed system senses the object detection which is present in front of the vehicle. Whenever the sudden object detection is detected the speed of the vehicle is reduced by applying the brake gradually after the warning signal through the buzzer. The stopping distance is calculated for the proposed system and the automatic braking is activated before vehicle impacts. The proposed system reduces the collision and damage to the vehicles. The basic objective of this project is to create a vehicle that can detect any obstacles in the path and auto brake immediately, along with an alarm to caution the user of the obstacle and change the course of the vehicle. The controller used for the entire project is Arduino UNO. There's an ultrasonic sensor that is attached to the front of the vehicle and continuously takes readings to detect obstacles. The vehicle contains 2 wheels that are connected to the DC Motors. These DC motors are connected to the Arduino UNO via a Motor Driver. There's a Piezo Buzzer connected to the Arduino. UNO that goes off in case an obstacle is detected by the Ultrasonic Sensor. The vehicle also consists of a Bluetooth module HC-05 that is attached to the Arduino UNO and helps us connect a wireless device to the vehicle for control. Just by simply pairing the device to the vehicle and using the specified application, the vehicle can be controlled externally by a wireless device.

CONCLUSION

The basic objective of this project is to create a vehicle that can detect any obstacles in the path and auto brake immediately, along with an alarm to caution the user of the obstacle and change the course of the vehicle. The controller used for the entire project is Arduino UNO. There's an ultrasonic sensor that is attached to the front of the vehicle and continuously takes readings to detect obstacles. The vehicle contains 2 wheels that are connected to the DC Motors. These DC motors are connected to the Arduino UNO via a Motor Driver. There's a Piezo Buzzer connected to the Arduino UNO that goes off in case an obstacle is detected by the Ultrasonic Sensor. The presence of each module is well thought out and carefully placed, contributing to the best functionality of the unit. Benefits include low cost, reduced complexity, simple speed control, high reliability, and easy implementation. The entire development was carried out with the aim of making it as instructive as possible for subsequent assembly with electronic components. These car models are easy to make on a smaller scale and quick to compute. These are not affected by the noise in the surrounding area. These can easily detect the object at a distance. These can easily detect the edges and their respective orientation. The vehicle also consists of a Bluetooth module HC-05 that is attached to the Arduino UNO and helps us connect a wireless device to the vehicle for control. Just by simply pairing the device to the vehicle and using the specified application, the vehicle can be controlled externally by a wireless device.



Artwork by Janis Andzans

SHARK TANK

Shark Tank India became one of the most talked-about shows in the country with its season debut. Despite being a business reality programme, it quickly became such an interesting show that every member of the family sat down for dinner to watch it. Entrepreneurs present their businesses to a board of investors to obtain money on India's franchise of America's Shark Tank. Out of 62,000 registered start-ups, 198 were chosen for the pitches; 15% of all start-ups included were technology firms, with 7% utilising new technologies such as AI, ML, IoT, and Robotics. Let's take a look at the top startups showcased and financed on Shark Tank that rely heavily on technology.

1.

THINKERBELL LABS

RS. 1.05 CRORES FOR 3% EQUITY

Annie, BITS Pilani grads' flagship invention, became the world's first self-learning Braille device for the visually handicapped, allowing students to study, learn to read, write, and type in Braille. In addition, the companion app allows teachers to track real-time progress and provide homework. Local governments can also use the cloud platform to evaluate, compare, and remediate kids. Prathamesh Sinha, a charming 10-year-old from Pune, performed the demonstration for the sharks. With his razor-sharp intelligence and replies, he won the sharks' hearts. Customers of the app include the governments of Jharkhand, Telangana, Uttar Pradesh, and Chattisgarh, as well as the Tech Mahindra Foundation and Mitsubishi Industries.



2.

AAS VIDYALAYA

RS. 1.5 CRORES FOR 15% EQUITY.

AAS Vidyalaya, an EdTech start-up and abbreviation for Anytime Anywhere School, claims to be India's first online school. By bringing the school to students who are unable to attend, AAS is overcoming the availability and accessibility of high-quality education in India. AAS Vidyalaya teaches Mathematics, Science, Hindi, English, Social Science, Sanskrit, Computers, and Marathi. It also adheres to a variety of educational curriculum, including ICSE, NCERT CBSE, NIOS, the UP Board, the MP Board, the Bihar Board, the Rajasthan Board, and the Maharashtra Board. Digital and frequent examinations, report cards, instructor interactions, online courses, and parent contact are all possible with the app.



3.

ROADBOUNCE

RS. 80 LAKHS FOR 20% EQUITY

RoadBounce is a pothole identification software that includes maps in order to improve riding quality in India. Due to India's poor roads and potholes, a large number of accidents occur. The RoadBounce gadget is a pavement monitoring platform for broad road networks that detects and warns riders of impending accidents. Geotagged roughness indicator, before-and-after comparison, video interface, and 100 to 200-meter resolution are all included.



4.

PROXGY

RS. 1 CRORE FOR 10% EQUITY.

Proxgy, which was launched during the pandemic, is a global service that allows customers to book a real-world human avatar at any time. Customers can use the avatar to navigate physical areas and enjoy a live immersive experience indoors. The start-tech up's stack includes 360-degree rotating cameras on Proxgy smart helmets, as well as 3D viewing and broadcasting capabilities. Proxgy has marketed this gadget for a variety of experiences, including shopping, tourism, real estate viewing, remote KYC, mining, surveillance, and others.



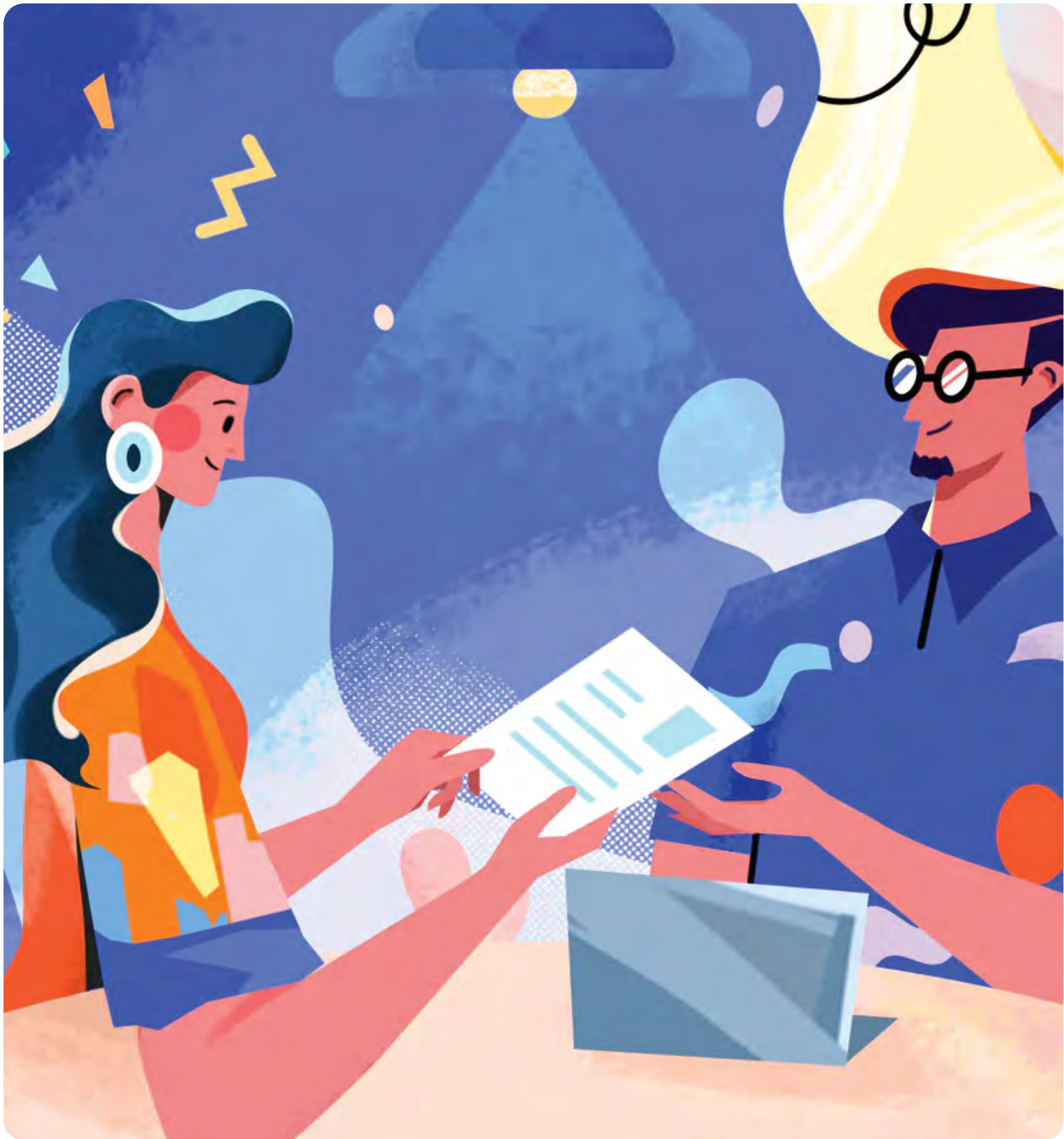
5.

REVAMP MOTO

RS. 1 CRORE FOR 2% EQUITY.

Proxgy, which was launched during the pandemic, is a global service that allows customers to book a real-world human avatar at any time. Customers can use the avatar to navigate physical areas and enjoy a live immersive experience indoors. The start-tech up's stack includes 360-degree rotating cameras on Proxgy smart helmets, as well as 3D viewing and broadcasting capabilities. Proxgy has marketed this gadget for a variety of experiences, including shopping, tourism, real estate viewing, remote KYC, mining, surveillance, and others.





Artwork by Carl Wheatley

INTERVIEW

INTERVIEW

WITH

HARI KHATAVKAR



Hari pursued his BE in Electronics Engineering at TCET and went on to complete his Masters in Business Analytics at University of Connecticut. He is currently working as a full time Associate Consultant in Data Analytics at Slalom.

CAN YOU PLEASE TELL US SOMETHING ABOUT YOUR EXPERIENCE IN COLLEGE?

I was a member of the editorial magazine committee when I was in TCET in 2017. I was also involved in various IETE activities and TEDx. I've always been curious and eager to learn new things. As an engineering student, I attempted to evaluate various countries and the courses they provided. You must always conduct research, think clearly, and time your actions accordingly. My advice is to do your research on universities and courses of interest before graduating. Two years may seem like a long time, but it is actually necessary to begin planning. Begin thinking as soon as possible so that you don't run out of time. I also prepared my documentation and took the GRE in the seventh semester. I had to prepare my semester grades, as well as a letter of recommendation and a transcript, which you will receive from the college.

HOW DIFFICULT WAS THE ENTIRE ADMISSIONS PROCESS?

The difficulty is determined by the planning

process you use. If you don't do enough research, you might end up at the wrong university and things won't go as planned. There are numerous blogs and YouTube videos available to assist you in determining the best path for you. Make sure to apply for admission at least 8 to 9 months before the start of your course. You should be very aware of the admission and course timelines so that you don't miss out on any opportunities due to a lack of knowledge.

DO YOU THINK AN IVY LEAGUE ADMISSION IS WORTH IT IF YOU GET IT, GIVEN THE HIGH FEES?

One thing to keep in mind is that Ivy League universities are private institutions. The majority of universities try to offer you the same thing, and the decision is entirely up to you. The ranking of the college is irrelevant as long as you give your all and work hard. Also, try to meet as many people as possible so that you can gain insight into the field in which you are interested.

It is critical to conduct research—visit the university's website. It will inform you about the various types of courses that they provide. You should also look into the elective and research opportunities available at that university. If you

are looking for Ivy, you should also consider the financial aspects and compare the universities. Also, try contacting people who are university alumni to find out how their experience has been.

WHY DID YOU CHOOSE THE COUNTRY KNOWN AS "USA" OVER OTHERS?

I conducted extensive research and discovered that I had shortlisted ten universities.

Based on my interests and career goals, I considered factors such as opportunities, costs, and extracurricular activities before deciding to pursue my master's degree in the United States.

IS LOCATION IMPORTANT WHEN LOOKING FOR UNIVERSITIES, AND IF SO, TO WHAT EXTENT?

Sometimes people just look at the University without knowing where it is.

Most of your basic needs will be met on campus, but it is also important to be aware of your surroundings. You should be aware of whether your area is urban or rural. You can also read about the student experiences of the locations to get a better picture of your neighbourhood and surroundings.

COULD YOU TELL ME ABOUT YOUR EXPERIENCE FROM THE TIME YOU APPLIED TO THE TIME YOU WERE ACCEPTED?

I registered for various exams, such as the GRE and TOEFL, and researched various universities. I talked to various people and tried to figure out which university would be the best fit for me.

HOW MANY MONTHS OF PREPARATION DO YOU THINK IS REQUIRED TO PASS EXAMS LIKE THE GRE AND TOEFL?

You could study for the GRE in 2-6 months. Is comparatively easier with GRE maths. Concentrating on English vocabulary is extremely beneficial. Always solve papers and take practice tests so you know where you stand and how much progress you need to make.

WHAT FACTORS INFLUENCE A UNIVERSITY'S DECISION TO HIRE A CANDIDATE?

Marks aren't the only thing that matter; you should also look over your professor's letter of recommendation. They also look at how well you define your purpose for being a part of the university, not just as a student but also as an individual.

TOPPERS

SECOND YEAR

SANDESH GAVALI
9.88

PRIYANSHU GIRI
9.68

SHUBHANGI JOSHI
9.32

THIRD YEAR

NIHAR DALVI
9.63

PRITIKA GHARAT
9.50

SHUDHANSHU SINGH
9.50

ISHIKA PHATKE
9.50

FOURTH YEAR

MANSI MISHRA
10.00

NITESH MOURYA
10.00

OM PANCHOLI
10.00

JANHAVI PIMPALKAR
10.00

ISHAAN SHINDE
10.00



ACKNOWLEDGEMENT

Talent is nothing, however experience, gained through humility and hard effort, is vital, and success is no coincidence. It takes dedication, hard effort, learning, studying, sacrifice, and, most importantly, a love of what you are doing or learning to accomplish. Our Elex magazine committee was committed from the outset to producing the greatest issue possible with all of our efforts and hard work. Our collaboration was critical to the success of our magazine launch, and we are proud of it. To bring you this issue, we poured our essence of creativity, design, articles, and every available drop. We are grateful to Dr. B.K. Mishra, Principal, and Dr. Deven Shah, Vice Principal, for their unwavering encouragement and support. Our heartfelt gratitude goes to our HOD, Dr. Sanjay Patil, and Faculty In-charge, Vaibhav Gijare, guided us through every pitfall. Finally, we would like to convey our heartfelt gratitude to all of the students, professors, and industry professionals who contributed significant articles and interviews to make our magazine unique.

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MAHARSHI THAKKAR



ADHYAY



Adhyay is the biannual magazine of the Electronics Department, and this is its volume 9, edition 2. The latest issue of our magazine Adhyay throws light on the world's advanced technological trends, with our special domain being Shark Tank India, 2022. From the Metaverse to Nanotechnology, this magazine's got it all and is perfect for your tech fix.