

# B-SMART

- WE EXPLORE WE EXHIBIT



NAME TO FAME  
HACKATHON STORIES  
TECHNICAL TRENDS

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## **B-SMART**

(**B**VRITian **S**tudent **M**agazine on **A**dvanced  
**R**esearch & **T**echnologies)



## **VISION**

To emerge as the best among the institutes of technology and research in the country dedicated to the cause of promoting quality technical education.

## **MISSION**

- Achieve academic excellence through innovative learning practices.
- Enhance intellectual ability and technical competency for a successful career.
- Encourage research and innovation.
- Nurture students towards holistic development with emphasis on leadership skills, life skills and human values.

**B-SMART** is here to keep the students and the faculty members informed with the latest development in the area of science, engineering & technology. It also inculcates the habit of reading among students about new trends in technology and emerging areas and to provide a platform to the student for sharing knowledge.

## *Principal's Message*



**Dr. K. V. N. Sunitha,  
Principal, BVRITH**

**“Excellence is not a destination, It is a continuous journey that never ends” - Brian Tracy**

As the journey continues, many milestones are crossed... And happy to say that, for BVRIT HYDERABAD College of Engineering, this journey was of hard work and success. And now, on the occasion of our decennial celebrations, when we look back, we realise that each and every day was an opportunity well-utilized, adding value to our journey.

Ten years have passed in a flash, and the baby steps have changed to firm and stable footprints. In these ten years, we have worked towards the overall development of the institution and the students. BVRITH is ranked 60th among the government and private institutions by the Dataquest-CMR employability ranking. The employability skills of the students have improved, as shown by our placement record. In our present final year, 321 students out of 420 eligible are already employed. Paloalto hired our student with a package of 54.75 LPA this time. There are 8 students with a package of more than 40 LPA. These students were just continuing the saga of their seniors, where four students from the previous batch had bagged 44+ LPA. The students' active participation in other technical and non-technical activities is also appreciated.

Let me announce the prize winner for the previous edition. The contributor of "Artificial Intelligence for Protein Folding Predictions", Sowmya Mudunuri of 21batch ECE has won the prize.

So, enjoy reading Volume 7, Issue 2 of BSMART, the Technical magazine of BVRIT HYDERABAD, where many of our recent achievements are mentioned. I congratulate the contributors of the articles and the faculty and student coordinators who worked sincerely to publish this edition of the magazine.

**With Best Wishes**

**Dr. K.V.N. Sunitha**

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## ‘ Name to Fame ’

**BVRIT HYDERABAD proudly introduces its star of the year and wishes her ‘The Best in Life’**



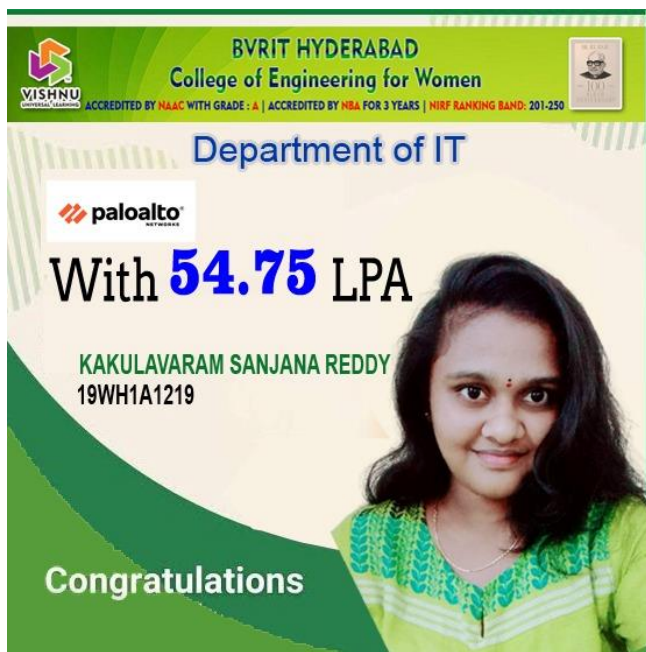
Hi all, This is K. Sanjana Reddy from the Department of information technology, batch 2019-2023.

It had been an exciting journey from a confused fresher in my 1st year to become a confident senior in 4th year. I would first like to take this opportunity to thank our Principal mam, our HoD mam, our college placements coordinators

**"It's not what you look at that matters, it's what you see."**

and faculty for their constant care and guidance. Without their support it would have been a very difficult journey throughout. I thank them for guiding me, which helped me build the confidence to get placed in a prestigious company like paloalto.

I have a great interest in mathematics and logical thinking, which paved my path to take up IT branch. As a fresher, I was very scared thinking of my future. But with the support of the college, I could overcome that fear. The programmes organized by the college like WISE and Being Zero boosted my confidence, and help me improve my knowledge and coding skills.



I was first introduced to coding in WISE. Through my journey in WISE I have learned many things, and added to that I was also able to get the practical knowledge through the projects we have done in WISE. Our college provided placement training through Being Zero, which helped me improve in coding. The trainers were always available to solve our doubts and

encouraged us to move forward. As a part of placement training our college had also conducted mock tests and mock interviews, which helped me to attend the placement tests and interviews with great confidence.

I always believe that hard work will always lead to positive results, and my hard work have helped me move a step ahead in my life.

I would like to conclude by thanking everyone who always encouraged me and made my journey beautiful.



**K. Sanjana Reddy**

**IV year IT**



## COVER STORIES

### COVER STORY – 1

#### **2<sup>nd</sup> PRIZE WINNERS IN PROMETHEAN-2K22 OF B.V. RAJU INSTITUTE OF TECHNOLOGY**

**Title :**

**MULTI PURPOSE RESCUE  
DRONE**

#### **Team Members:**

**Ms. M. Nikshiptha**

**Ms. D. Harshitha**

**Ms. N. Harshini**

**Ms. T. Nehasri**

**(CSE & ECE)**

**(From Drone Technology  
Lab, BVRITH)**



We are the team AVENG”HER”S. Team of four – M. Nikshiptha, D.Harshitha, N. Harshini, T. Nehasri. We have participated in PROMETHEAN – 2K22 conducted by B.V. Raju Institute of Technology and won 2nd prize. Our project is MULTIPURPOSE RESCUE DRONE. We have different application which will be used to rescue the people. A single DRONE can be used for all those applications.

**MEDICAL BOX** – We can delivery the medicines or the organs which will be sustaining only in sustain temperature. And the uniqueness in our application is we can set the temperature which varies from -5 to 30 degree Celsius. It will be useful to delivery the medicines and organs which are not available in nearby places in fast and efficient way.

**PARACHUTE BOX** – At some natural disasters we can deliver their requirements with the help of DRONE. Even though we have an option of delivering those with helicopters but its expensive and time taking process. Hence, parachute box will be released from the air itself as we attached parachute the requirements will be landed safely.

**FIRE FIGHTER** – At the time of FIRE ACCIDENTS the fire men are not getting the proper information. So, to help them we can send our DRONE which is attached with the Thermal Camera and a Gas sensor. The Thermal Camera will be sending the information of the fire spot to the rescue team, which will be easy for them to reach the people who struck inside. And Gas sensor will be detecting different gases which are released during fire accidents. And we also attached a Fire Extinguisher to that which will reduce the fire at small areas.

**“The secret of success is to be ready when your opportunity comes.”**

## **COVER STORY – 2**

### **2<sup>nd</sup> PRIZE WINNER IN DRONE COMPETITION OF B.V.RAJU INSTITUTE OF TECHNOLOGY**



#### **Title:**

#### **CROP MONITORING DRONE**

#### **Team Members:**

**Ms. P.M Vaanisha**

**Ms.Nitisha Thallapally**

**Ms.Panatula Abheeshtha**

**(III CSE)**

**(From Drone Technology  
Lab, BVRITH)**

Hi, I am Vaanisha P.M of III CSE along with team, Nitisha Thallapally, Panatula Abheeshtha have participated in the BV Raju Institute of Technology NARSAPUR, DRONE COMPETITION on 13th October 2022 and presented our idea “Crop Monitoring Drone”. Our product is a camera Drone combined with a software which is aimed to help farmers. Our motivation to develop this product is the zeal to help the farmers who contribute the most in the development of the nation. We have encountered many real-world situations where we have observed that crops get destroyed by many external factors which are not detected early. In the process of developing a prototype for the product we have studied the most common problems faced at the time of crop growth. Hence, we are in the process of developing the prototype and are expecting to finish the project at the earliest.

We won second prize in the event and we got to interact with fellow enthusiasts. We were happy to receive feedback from the experts that helped us in understanding the implementation better. We were truly overwhelmed and further motivated to keep working. It gave us a responsibility which we are going to fulfil by doing our best.

**“If you do what you always did, you will get what you always got”**

## **COVER STORY – 3**

### **1<sup>st</sup> PRIZE WINNERS OF PROMETHEAN 2K22 IN B.V. RAJU INSTITUTE OF TECHNOLOGY**



#### **Title :**

#### **DRONE AS AN EMERGING TECHNOLOGY**

Hi, I'm K. Sriya Tejaswi of III ECE with team, K. Srikala and B. Pavithra have participated in promethean 2k22 conducted by BVRIT Narsapur on 12th and 13th of October 2022 and presented our poster on "Drone as Emerging Technology". Drone is an UAV-UNMANED AREIAL VEHICLE, which is operated from ground. Drone is an existing technology which has been developing in various Industries like Agriculture, Survey, Inspection, Military, Photography, Delivery, Rescue & Emergency Operations.

#### **Team Members:**

**Ms. K. Sriya Tejaswi**

**Ms. K. Srikala**

**Ms. B. Pavithra**

**( III ECE)**

#### **(From Drone Technology Lab, BVRITH)**

**Agriculture-** In agriculture sector, drones are used for Pesticide Spraying in Farm Fields.

**Survey-** In surveying sector, Drones are used to survey Lands and Roads.

**Inspection-** Drones are used to inspect WindMills, Transmission Lines and Commercial Buildings to check if any damages are present.

**Military-** Drones are used as Armed Forces in Military. Recently in Russia and Ukraine war, both the countries have used drones to attack.

**Photography-** Drones are being used to take pictures and shoot videos in different events.

**Delivery-** Drones can also be used to deliver different Consumer Goods.

**Emergency & Rescue-** Drones can also be used in Rescue and Emergency situations by delivering Medical Supplies and Necessary Goods.

In upcoming days, Drones will become quite popular and can be expected to be used in Daily Life. By using drones Time is Saved and Technology is Developed. We won First Prize in the event. The moment we received the prize was not just overwhelming but it also encouraged us to work more. It gave us a responsibility which we are going to fulfil by doing our best.

**"Two wrongs do not make a right."**

## **COVER STORY – 4**

### **2<sup>nd</sup> PRIZE WINNERS OF PROMETHEAN-2K22 IN B.V. RAJU INSTITUTE OF TECHNOLOGY**



#### **Title :**

#### **SURVEY USING DRONES**

#### **Team Members:**

**Ms Meghamala**

**Ms Ajitha**

**Ms Likhitha**

**(III ECE & III EEE)**

**(From Drone Technology  
Lab, BVRITH)**

Greetings! I am Meghamala of III ECE followed with my team Ajitha and Likhitha of III ECE and EEE. We are the students of Drone Technology Lab, BVRIT HYDERABAD. We have participated in Promethean 2k22 Poster Presentation competition held on 12th and 13th October at BVRIT Narsapur. We have presented a poster on “Survey Using Drones”. The poster represents the usage of Drones in different aspects like Surveying. A survey is examining a process and obtaining data, here I’m talking about land, construction site, mountain, forests etc., Surveying them using traditional methods could be a complex time taking process with many instruments and devices and takes more man power. To overcome this problem by technology, Drones are been introduced. Drone can potentially help us on surveying to save time and money, it is now widespread and operational. Survey drones has downward facing sensors with multispectral and RGB cameras. A VTOL (Vertical take-off and landing) drone is used for surveying. Unlike satellite imagery, drones can fly at a much lower altitude, making the generation of high-resolution, high-accuracy data, much faster, less expensive and independent of atmospheric conditions like cloud cover. Our poster had the pictorial representation of the description. We have won 2nd prize in the competition. The judge’s assessment was obliging. The interaction with fellow participants by sharing ideas and getting feedbacks was really helpful.

**“Key to success is action, and the essential in action is perseverance.”**



## **COVER STORY – 5**

### **PARTICIPATED IN EMPOWER 2K22**

**Title :**

### **INFANT CRY DETECTOR, WALK MATE**

#### **Team Members:**

**Ms.Buvika Kareke**

**Ms.Thota Monisha**

**Ms.Chilamanthula Srija**

**Ms.Ch Krishnaveni**

**( IV ECE)**



Hey there, I am Buvika Kareke from Final year ECE. I've recently attended EMPOWER 2022 at IIT Madras with my friends Thota Monisha, Chilamanthula Srija and Ch Krishnaveni and I would like to share my experience about the event here. EMPOWER 2022 is an international conference organized by IIT Madras Research Park for three days from 13th October 2022 till 15th October 2022. It is one of the biggest Assistive Technology Summit organized every year to promote and enhance innovations in the domain. The three days' events included guest lectures, paper presentations and product idea showcasing related to Assistive technology. Distinct people from different parts of the world took part in the events and showcased their ideologies. We have got an opportunity to learn and explore unique and smart solutions for addressing the necessities of differently abled. Flexible knee, Automated and Semi-automated games for hand rehabilitation, Device which assists visually impaired to code in languages such as python, 9-keys learning key-board for people with autism, Smart gesture recognition for people using sign languages etc., are a few of the amazing solutions which were presented at the conference. We have presented two projects; Infant Cry Detector and Walk mate

**“Success isn’t just about what you accomplish in your life, it’s about what you inspire others to do”**



from our college. Students from around 10 different universities and colleges took part and presented their smart innovations. Apart from the idea product presentations there were workshops conducted by different start-ups to showcase their unique solutions and also to help young entrepreneurs understand the industry better. These workshops not only included technical presentations about how an issue is resolved but also contained hands-on experience with the solution approach. We were allowed to have a query and methodology discussion on how a currently used technique is best suited, which helped us analyze the needs of the target market better. We have also got an opportunity to meet and have a talk with many extremely talented and unique differently abled people from different parts of the world, we have got an opportunity to showcase our work to them and get direct feedback from them. Most of all, we have CEO's, project managers, heads of projects and many successful entrepreneurs as our audience while we present our ideas. The feedback and suggestions which we have received from such dignitaries has actually helped us brainstorm more about the features and enhancements to our projects. Overall, it was a very knowledgeable and helpful medium to connect, showcase and upskill one's project.

### Energy Storage and its applications for Aatma Nirbhar Bharat

#### Introduction:

The energy storage is mainly used to compensate the variability of renewable energy sources. It means that the energy storage systems can absorb and store the excess power available with the renewable sources and deliver power to the load as and when required. With this feature, energy storage can increase the power availability time in the system and leads to improved utilization of renewable energy sources. They also provide the flexibility for the operation of distribution systems with their charge/discharge power control capability.

#### Applications of Energy Storage:

There are several applications of energy storage systems such as power balance, peak shaving, and demand response, etc. An example of grid-connected battery energy storage is shown in Fig.1

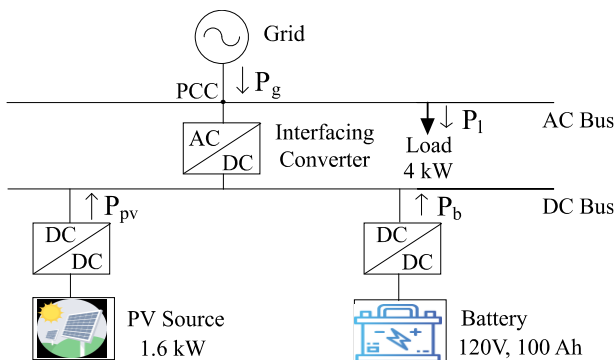


Fig 1. Grid connected system with battery energy storage

The active power balance is the essential condition to be satisfied for normal operation of the power system.

The process of reducing peak power is considered as peak shaving. It is possible to reduce the peak powers by discharging the energy storage during peak power hours. The peak shaving is helpful for reducing the infrastructure cost. Because, the infrastructure cost depends on the peak power of the system. Further, recently the time variation of energy price is introduced which is currently applicable for some of the industrial customers in India. For example in case of the time-of-use energy price structure, the energy price is low during the off-peak load hours and it is more during the peak hours. Therefore, reduction in the peak power leads to the reduction in the energy consumption cost. Further, the use of energy storage along with renewable energy sources allows the consumers to change their load profile patterns and participate in demand response programs.

On the other side, in the transportation sector for electric vehicles applications, the energy storage is very important. The increased use of EVs provide reduced carbon emissions as well as reduced environmental pollution. There are many start-ups coming in manufacturing of EVs. In India, the extensive use of energy storage systems will enable the nation to achieve 40 per cent renewable energy penetration target by 2030 [2]. Therefore, considering the above discussion it is not sufficient to have only green energy technologies for the development of the country. It is important to have energy storage available with the green energy technologies for increased flexibility and several benefits which leads to the overall growth of the country. Therefore, it is very important to design and manufacture highly

efficient energy storage systems in order to make India self-reliant in power industry.

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**Mr. Rampelli  
Manojkumar,  
Assistant Professor  
Department of EEE**



### **Ameca: The robot shows off new level of human-like facial expressions**

Engineered Arts, the premier creator and manufacturer of humanoid entertainment robots in the UK, developed Ameca, the world's most advanced human-shaped robot. Ameca is the most advanced and realistic humanoid robot in the world, exhibiting cutting-edge humanoid robotics technology. Ameca is a cloud-connected platform that increases the power of AI by providing an artificial body on which AI and machine learning systems may be tested and developed alongside Engineered Arts' powerful Tritium robot operating system.

This enables robotics businesses to put their ideas to the test. Ameca allows companies that are developing AI or machine learning technologies to test and demonstrate their products in front of a live audience. Engineered Arts' Ameca hardware is built on their own research into humanoid robotics and is built on

their advanced Mesmer technology. Mesmer was developed in such a way that it could deliver a speech in the voice of a human who was working behind the scenes. The friendly nature of the robot makes it an ideal platform for establishing human-to-human connections in any Metaverse or digital workplace. Owners can also use their personal avatar to view all robotic data from anywhere on the planet, animate and simulate it.



Ameca's smile, capacity to blink its eyes frequently, gasp in surprise, scratch its nose, and even have a fun gazing contest with its owner are just a few of its high-tech features.

Ameca's Interesting Facts:

1. Each module can run separately, allowing you to have simply one ahead of you, or even just one arm. A whole robot is not required.
2. Ameca has a camera in each of its eyes, allowing it to recognise people, monitor their faces, detect objects such as a finger in front of its face, and so react when a hand is placed in front of its face.
3. Ameca's movements are more realistic than those of any previous robot; its shoulder

**"Courage is resistance to fear, mastery of fear--not absence of fear."**

movements are identical to those of a person, and it can move its hand all the way to the side of its head.

Ameca's main objective, according to the corporation, is to serve as a platform for artificial intelligence development. The business claims it will leave researchers working with its platform to design artificial intelligence and machine learning algorithms for their products. Because the robot is cloud-connected, engineers may connect to it remotely to diagnose faults, and many problems can be rectified remotely.

**Dr. V. Hindumathi**  
Associate Professor  
ECE Department



## Hybrid Optical/Acoustic Under Water Communication

### Introduction:

Underwater wireless information transfer is of great interest to the military, industry, and the scientific community, as it plays an important role in tactical surveillance, pollution monitoring, oil control and maintenance, offshore explorations, climate change monitoring, and oceanography research.

In order to facilitate all these activities, there is an increase in the number of unmanned vehicles or devices deployed underwater, which require high bandwidth and high capacity for information transfer underwater.

## Existing Under Water Communication Techniques

Sl No	Type of Under Water Communication	Features	Advantages	Disadvantages
1	RF Communication	i) Data rate in Mbps. ii) Latency is moderate. iii) Distance is up to 10 meters. iv) Bandwidth is 3 to 300 Hz. v) Transmission power is few mW to hundreds of mW.	i) Crosses air/water/seabed boundaries easily. ii) Unaffected by turbidity, salinity, acoustic noise and pressure gradients. iii) Works in non-line-of-sight.	Distance used for communication is very low.
2	Optical Communication	i) Data rate in Gbps. ii) Latency is Low. iii) Distance is 10 to 50 meters. iv) Bandwidth is 10 to 150 MHz. v) Transmission power is few W.	i) Ultra-high bandwidth: gigabits per second. ii) Low cost. iii) Latency is low.	i) Needs line-of-sight ii) Very short range
3	Acoustic Communication	i) Data rate in Kbps. ii) Latency is High. iii) Distance is up to Kms. iv) Bandwidth is distance dependent: a) 1000 Kms < 1 KHz b) 1-10 Kms = 10 KHz c) <100 m = 100 KHz iv) Transmission power is 10s of W.	Very high range up to 20 Kms	i) Low data transmission rate in kbps. ii) Latency is High. iii) Adversely affected by turbidity, ambient noise, Salinity.

• From the above table it is evident that RF Communication is not suitable for communication above 10 meters. Optical communication needs line-of-sight & for acoustic communication data transmission rates is low. To overcome these disadvantages an effective communication technique is proposed - “Hybrid Optical/Acoustic under water communication”.

### Proposed Method - “Hybrid Optical/Acoustic Under Water Communication”:

• University of Warwick-UK & King Abdullah University of science and technology-Saudi Arabia, extensively working on this “Hybrid Optical/Acoustic under water communication”.

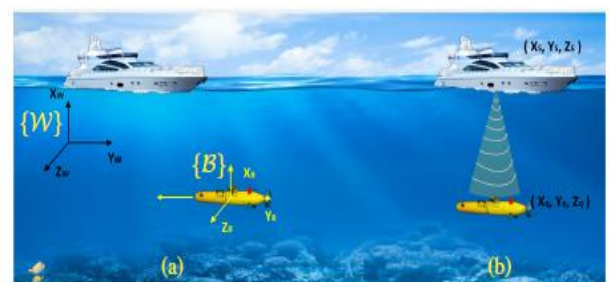


Fig: Proposed Method - “Hybrid Optical/Acoustic Under Water Communication”

• From above fig, (a) Acoustic communication is used by an AUV (Autonomous Under Water Vehicles) to move closer to the surface ship equipment sensor. (b) Optical communication

**"Motivation is what gets you started. Habit is what keeps you going."**



link is used once within this range for high data transfer.

- “Hybrid Optical/Acoustic under water communication” technique presents a novel optical acoustic two-way communication link. 1) The downlink of this communication system, from the ship or base station to the AUVs (Autonomous Under Water Vehicles), is a wide-angle low-bandwidth acoustic link which is also used for tracking and locating the AUVs. 2) Meanwhile, the multiple uplinks are high-bandwidth, highly-directional optical links for data transmission between ship or base station to the AUV. The purpose of the underwater AUVs is to relay high volumes of monitored data to the base station where it processes the information.

#### **Conclusion:**

- Proposed method - “Hybrid Optical/Acoustic under water communication” facilitates the Acoustic communication technique for navigation/tracking and Optical communication technique for data exchange.

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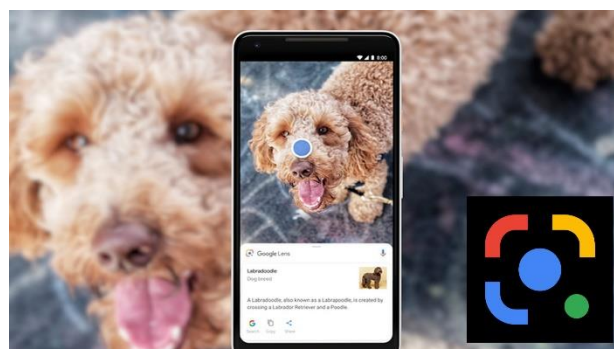
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**Mr. G. Shiv Sankar  
Varma**  
Assistant Professor  
ECE Department



### **Technical aspects of Google lens**

Let's appreciate the fascinating features and technology behind Google lens through this article. The google lens was first introduced by Google in 2017, in 2019 some more features were added. Upgraded android mobiles already have google lens in the camera but one can easily install and enjoy the application. Talking about features, google lens assists you to identify, search, shop, translate, by just using your mobile camera. For instance, using GL, take a picture of



SSID sticker on the back of a wi-fi router, will automatically connect you to the wifi. While travelling u face language issues, point the lens at text on road side, some shop name, restaurant name, it will translate for you. U got stuck in some mathematical equation, capture it through lens, it will give step-by-step explanation for you. You want to identify any plant, animal, monument, landmarks, buildings, take help from google lens. Want to buy something u seeing, capture and do the shopping. To explore more about google lens check <https://lens.google/>.

Technology behind this application: After the Google Go captures an image, it needs to make sense (shapes and letters) for text and image recognition, so optical character recognition (OCR) uses Region Proposal Network (RPN). This is a fully convolutional network which predicts object and objectness scores at each position. It is trained to generate high quality

**" All progress takes place outside the comfort zone"**



region proposals and uses Fast R-CNN for detection. While capturing the text, it can have different fonts, styles or it can be blurry, it can cause the model to misunderstand words. To improve the accuracy, GL uses Knowledge Graph, this provides contextual clues, such as a word is a noun and should not be spell-corrected etc. The Convolutional Neural Networks have become the backbone of most of the computer vision applications, for obvious reasons. It's not wrong to say that deep learning has majorly shifted towards designing CNN architectures. Google lens also uses CNN and LSTM networks, as models, trained on data from a variety of sources, ranging from ReCaptcha to scanned images from Google Books. To build a universal tool, google used CameraX, to capture high-quality images with nominal lag. CameraX is a new Android support library, available in Jetpack. It is an abstraction layer over the Android Camera2 API that resolves device compatibility issues. Lens uses Google Translate's Neural Network Translation Algorithms, to translate entire sentences at a time, rather than going word-by-word, this preserves proper grammar and diction. The most helpful way with Google Lens is reading the text aloud. For High-fidelity audio, google applies machine learning to disambiguate and detect entities like dates, phone numbers and addresses, and generates realistic speech using DeepMind's WaveNet.

This application is indeed a breakthrough in mobile applications using artificial intelligence.

## References:

1. <https://analyticsindiamag.com/these-machine-learning-techniques-make-google-lens-a-success/#:~:text=Lens%20uses%20Google%20>

[0Translate's%20neural,preserve%20proper%20 Ogrammar%20and%20diction.](https://en.wikipedia.org/wiki/Google_Lens://d oi.org/10.1021/jacs.5b12728)

2. [https://en.wikipedia.org/wiki/Google\\_Lens://d oi.org/10.1021/jacs.5b12728](https://en.wikipedia.org/wiki/Google_Lens://d oi.org/10.1021/jacs.5b12728)

**Dr. Geetika Silakari Pandey**  
Asst. Professor, R&D  
incharge  
Department of CSE(AIML)



## Bio-Inspired Super wettability Materials

In recent years, emerging research on superwettability (anti-wetting) materials superoleophobic / superoleophilic surfaces to displace the organic liquids besides water. A series of efforts on focusing of extreme wettabilities, the essence of superwettability system gradually evolved and has since become a rapid development area of active research. Superwettability integration has been proposed and fabricated, showing a co-operative and complementary effect on material properties. The idea of designing the integration is also illustrated as conducting the significant difference in surface energy between two surfaces.

### Superwettability in Gaseous media:

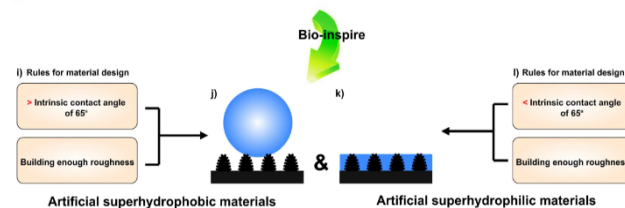


Fig 1: Natural organisms have inspired the design of superhydrophobic materials in gaseous media

**“If you not willing to risk the usual you will have to settle for the ordinary”**

Barthlott et al., discovered the lotus plants consists of the self-cleaning property which due to low adhesion superhydrophobic property to the microscaled papillae integrated into hydrophobic epicuticular wax. Mosquito's eyes obtain a super hydrophobic function by virtue of micro-ommatidia covered by nano-nipples section: The main criteria for making artificial superhydrophobic and superhydrophilic materials i.e., the surfaces of materials should exhibit a water contact angle  $\theta > \text{or} < 65^\circ$  and it consists of sufficient roughness, such as two-tiered micro / nanostructures.

#### Superwettability in aqueous media:

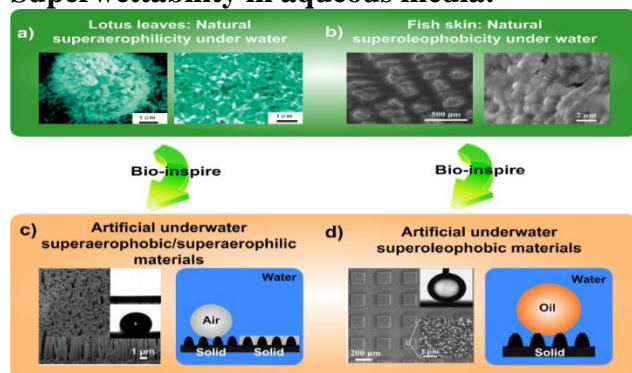


Fig 2: Natural organism inspired the design of superhydrophobic materials in aqueous media.

In general, various types of fish can keep their bodies clean, in view of mucus layer covered on their surface it consisting of a hydrogel. Due to this hydrophilic chemical composition on the surfaces and hierarchical scale structures, fish skin exhibits superhydrophilicity in air and superoleophobicity under water. Artificial organisms inspired from natural organisms, underwater superoleophobic materials have been organized by using pillar-arrayed silicon substrates, to increase the roughness, vertically aligned nanowires were generated on the micropillars.

#### References:

Bin Su et al. Bio-inspired Interfaces with Super-Wettability: From Materials to Chemistry. J. Am.

Chem. Soc., Vol. 6, 138, 2016.P.1727–1748.  
<https://doi.org/10.1021/jacs.5b12728>

**Dr. Ch. Bharath Kumar**  
 Associate Professor  
 Department of BS&H



## BLOCK CHAIN Distributed Ledger Technology

### Introduction

Block chain is a peer-to-peer decentralized distributed ledger technology that makes the records of any digital asset transparent and unchangeable and works without involving any third party intermediary. It is an emerging technology that is having huge public attention. It is allowing thousands of computers or servers to maintain a single secured and immutable ledger. Blockchain can perform user transactions without involving any third party. It is also called Blockchain wallet which is nothing but a program that allows one to spend BTC, ETH, etc. Such wallets are secured methods so one can have full control over.



**Advantages of this are** Transparency, Immutability, High Availability, High security.

### HOW TO LEARN BLOCKCHAIN!?

Now - a - days learning blockchain is easy. There are many online courses and training sessions. Block chain council is one such organization that offers online training and certification programs

**“There are no mistakes, only opportunities.”**

for beginners. So that they can have successful career in Blockchain.

**References:** [www.simplilearn.com](http://www.simplilearn.com)

**Ms R Sravani**  
**Asst Professor**  
**Department of IT**



## **Model Implementations for Inference (MII)**

DeepSpeed-MII is a new open-source python library developed by Microsoft Research to promote the broader adoption of low-latency, cost-effective inference of high -performance models.

### **What is Deep Speed?**

DeepSpeed is an open-source deep learning optimization library for PyTorch. The library is designed to reduce computing power and memory use and to train large, distributed models with better parallelism on existing computer hardware.

In February, 2021 Microsoft Research announced DeepSpeed, an open-source deep learning training optimization library, and Zero Redundancy Optimizer (ZeRO) [1], a novel memory optimization technology in the library, which vastly advances large model training by improving speed, Scale, Usability, and cost. Its stable release was on January 14th , 2022 by Microsoft research.

- Deep Speed is thus a deep learning optimization library that makes distributed training easy, efficient, and effective.
- It can train DL models with over a hundred billion parameters on the current generation of GPU clusters while achieving over 5x in system performance compared to the state-of-art.

- Early adopters of DeepSpeed have already produced a language model (LM) with over 17B parameters called Turing-NLG [2], establishing a new SOTA in the LM category.

- DeepSpeed is a tool in the Machine Learning Tools category of a tech stack.

- DeepSpeed is an open source tool with 6.1K GitHub stars and 695 GitHub forks.

smile, capacity to blink its eyes frequently, gasp in surprise, scratch its nose, and even have a fun gazing contest with its owner are just a few of its high-tech features.

DeepSpeed-MII is a new open-source python library from DeepSpeed, aimed towards making low-latency, low-cost inference of powerful models not only feasible but also easily accessible.

- MII offers access to highly optimized implementations of thousands of widely used DL models.

- MII supported models achieve significantly lower latency and cost compared to their original implementation.

- ✓ MII reduces the latency of Big-Science Bloom 176B model by 5.7x, while reducing the cost by over 40x as shown in Figures 2 (left) and 8.

- ✓ MII reduces the latency and cost of deploying Stable Diffusion by 1.9x as shown in Figure 2 (right).

- To enable low latency/cost inference, MII leverages an extensive set of optimizations from DeepSpeed-Inference such as deepfusion for transformers, automated tensor-slicing for multi-GPU inference, on-the-fly quantization with ZeroQuant, and several others (see below for more details).

- With state-of-the-art performance, MII supports low-cost deployment of these models both on-

**"Motivation is what gets you started. Habit is what keeps you going."**

premises and on Azure via AML with just a few lines of codes.

### How does MII works?

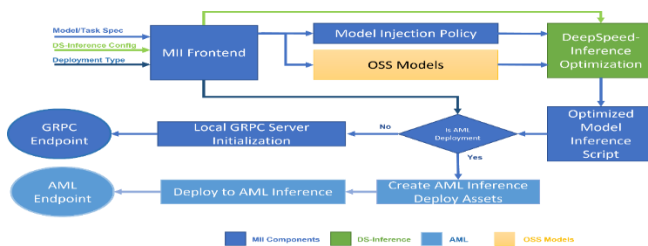


Figure 1: MII Architecture, showing how MII automatically optimizes OSS models using DS-Inference before deploying them on-premises using GRPC, or on Microsoft Azure using AML Inference. (Src:- <https://www.microsoft.com/en-us/research/project/deepspeed/deepspeed-mii/>)

Under-the-hood MII is powered by DeepSpeed-Inference [3]. Based on the model type, model size, batch size, and available hardware resources, MII automatically applies the appropriate set of system optimizations from DeepSpeed-Inference to minimize latency and maximize throughput. It does so by using one of many pre-specified model injection policies, that allows MII and DeepSpeed-Inference to identify the underlying PyTorch model architecture and replace it with an optimized implementation (see Figure 1). In doing so, MII makes the expansive set of optimizations in DeepSpeed-Inference automatically available for thousands of popular models that it supports.

### Supported Models and Tasks

MII supports a growing list of tasks such as text generation, question-answering, text classification, etc, across thousands of transformer models available through multiple open-sourced model repositories such as Hugging Face, FairSeq, EluetherAI, etc. It supports dense models based on BERT, RoBERTa, GPT, OPT, and BLOOM architectures ranging from a few hundred million parameters in size to hundreds of billions of

parameters in size. At the same time, it supports recent image generation models such as Stable Diffusion.

### MII-Public and MII-Azure

MII can work with two variations of DeepSpeed-Inference. The first, referred to as ds-public, contains most of the DeepSpeed-Inference optimizations discussed here, is also available via our open-source DeepSpeed library. The second referred to as ds-azure, offers tighter integration with Azure, and is available via MII to all Microsoft Azure customers.

While both variants offers significant latency and cost reduction over the open-sourced PyTorch baseline, the latter, offers additional performance advantage for generation based workloads.

### References:

1. <https://datasciencelearningcenter.substack.com/p/what-is-deepspeed>
2. Smith, S., Patwary, M., Norick, B., LeGresley, P., Rajbhandari, S., Casper, J., ... & Catanzaro, B. (2022). Using deepspeed and megatron to train megatron-turing nlg 530b, a large-scale generative language model. arXiv preprint arXiv:2201.11990.
3. Yazdani Aminabadi, R., Rajbhandari, S., Zhang, M., Awan, A. A., Li, C., Li, D., ... & He, Y. (2022). Deep speed inference: Enabling efficient inference of transformer models at unprecedented scale. arXiv e-prints, arXiv-2207



**Dr. Venkatesh B**  
Assistant Professor  
Department of CSE

**“When you feel like stopping think about why you started.”**



## Liquid Solar Energy System That Can Store Electricity For 18 Years

Due to a "radical" new scientific discovery, solar-powered electronics are one step closer to being a regular part of our life. A solar energy system that can store solar energy for up to 18 years and release it as heat when needed was developed by researchers at a Swedish university. By attaching the device to a thermoelectric generator, the researchers have now been successful in enabling it to generate electricity. The idea created at Chalmers University of Technology in Gothenberg may pave the way for self-charging electronics that utilize solar energy that has been stored and is available on demand, but it is still in its early stages.



Carbon, hydrogen, and nitrogen are used in the specifically created molecular system. The atoms in the solution rearrange and change shape when exposed to sunlight, causing the molecule to transform into an isomer with high energy. This serves as a method for storing liquid solar energy. Researchers were able to recover the power by combining a thermoelectric generator, an incredibly tiny device, with a liquid solar energy storage method. To power them, the technology can be included into headphones and smartwatches.

The only usage of this technology so far has been to generate a little quantity of electricity, but researchers claim the results are very encouraging and may allow them to further modify the system to extract more energy.

### Reference:

<https://www.euronews.com/green/2022/04/12/solar-energy-can-now-be-stored-for-up-to-18-years->

[sayscientists#:~:text=Solar%2Dpowered%20electronics%20are%20one,it%20as%20heat%20when%20needed.](#)

**M. Vasavi Chowdary**

**EEE 4<sup>th</sup> Year**



## Swarm of 3D Printing Drones

A novel strategy for 3D printing, initiated by Imperial College London and Empa, the Swiss Federal Laboratories of Materials Science and Technology, employs flying machines known as drones that utilize collaborative construction techniques derived from nature like beehives. This innovation would indeed facilitate developing buildings and fixing them in high or complicated areas, transforming the way houses are built on the land.



The system, known as Aerial Additive Manufacturing (Aerial-AM), consists of drones that work collaboratively from a fixed schematic, trying to adapt its techniques as they progress.

The 3D-printing drones fly autonomously, however, there is the involvement of manpower in the cycle who can check progress and act immediately if required using the data given by the quadcopter. To put the idea towards the experiment, the team conducted four cement-like combinations for the UAVs to construct with. The drones evaluate the printed geometric features on a real-time- time basis and modify their actions to make check they satisfy the design specs, with a manufacturing precision of 5 mm. The proof-of-concept prints included a



2.05-meter-high cylinder made up of 72 layers of polyurethane-based foam material and a 0.18-meter-high cylinder made up of 28 layers of a handmade building cement-like substance.

**Reference:**

<https://singularityhub.com/2022/09/27/like-a-swarm-of-bees-these-drones-can-3d-print-structures-while-in-flight/>

**Akanksha Kacham**  
ECE 4<sup>th</sup> Year



### Smart Bathing: PerfectFill

It's a sophisticated bathtub made to make your bathroom feel like a spa. The temperature of the water, the amount of filling, the amount of fog, the color, and the timing of the draining are just a few of the variables that the users can regulate. The new Kohler PerfectFill technology, makes it more simpler to run the ideal bath.

You'll need to set aside some time to run the ideal bath. The last thing anyone want after a long day of work is a tepid tub, so we usually sit around and manually monitor the temperature as it fills. Even if the water is the ideal temperature right out of the tap, you still need to pay attention to the depth because a flood won't make you feel more at ease. Running a bath is therefore more work than you may imagine, especially when compared to having a shower.

By incorporating your tub into your smart home, Kohler's PerfectFill drain system ought to be



able to address that issue. The PerfectFill technology will automatically draw your bath to the ideal temperature and depth with only a simple voice command or via the connected Kohler Konnect app - no monitoring is required.

**Reference:**

<https://weobserved.com/new-inventions-2022.html>

**Kothapalli Deepthi**  
EEE 4<sup>th</sup> Year



### Digital Twins

The digital twin is a technique that allows us to create a virtual replica of a real-world object and assess its advantages and disadvantages before putting the finished product in the hands of the customer. It is a computer program that uses actual data from physical objects or systems as inputs and provides predictions or simulations of how those inputs will influence the physical object or system. It is a modern method of market research that simulates products using computer-aided design (CAD). A digital twin, on the other hand, is more sophisticated and designed for real-time simulations.



IBM provides a fantastic illustration of a digital twin, which is a wind turbine equipped with sensors that provide crucial information on the weather and energy output of its digital twin. Digital twins have several advantages over

previous models, including the ability to conduct a large number of simulations with reasonable accuracy and the ability to rapidly communicate newly discovered information to the wind turbine.

### Use cases for digital twins

- Before being built physically, items like turbines, railways, offshore oil platforms, and airplane engines can be developed and tested digitally.
- Manufacturing is the industry where the adoption of digital twins is most likely advanced, with manufacturers currently simulating their operations with digital twins.
- Digital twins of automobiles are created.

### Reference:

<https://weobserved.com/new-inventions-2022.html>

**Kokkula Shivani**

**EEE 4<sup>th</sup> Year**



### Solar Roof Shingles

Solar shingles are a relatively invention that mimic the appearance of standard asphalt roof tiles. They safeguard your roof, possess the same resilience and adaptability as standard shingles, and use solar energy from the sun to power your house. Depending on the solar shingle brand, each solar shingle will generate between 13 and 63 watts of energy.

Like regular shingles, solar shingles are lightweight, simple to install and are made to endure rain, wind, and hail. They could be an excellent solution for your home's roof in terms of energy efficiency. Depending on size of your home and average energy usage, the number of solar shingles required to power your house may

vary. Solar shingles have several advantages over large solar panels, including being visually beautiful, being more affordable, and being able to be taken down and put back up again.



You can include solar shingles into your current roof, negating the need to replace the entire structure. However, if you already need to overhaul your roof, investing in a new roof is not a bad idea. Solar shingles lasts more than 20 years but efficiency is reduced.

### Reference:

<https://www.makodesign.com/blog/2022/03/08/new-technology-inventions-mako-wants-in-2022/#section-9>

**Adapa Nithya Sri Harshini**

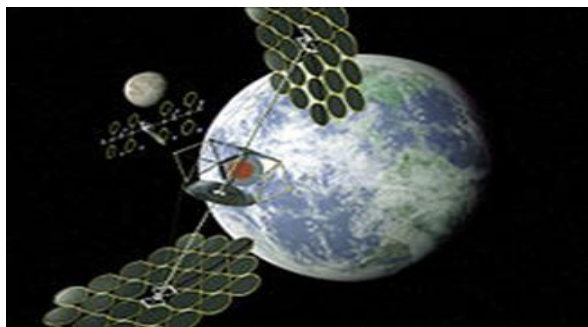
**EEE 4<sup>th</sup> Year**



### Space based solar power project

Pollution is one of the biggest concerns humans are facing. The major cause of the pollution is that we are unable to satisfy our needs with the energy that we currently possess. At present, solar energy is the most sustainable form of energy we possess. To make the most out of the solar energy, scientists are developing a new of absorbing solar energy from space and transmitting it to earth as microwave.

Recently, an experiment has been conducted between the mountains of Hawaii where they captured solar energy and beamed it about 92 miles to the main island of Hawaii. This demonstrates how we can transmit power wirelessly. In addition to microwaves, lasers also can carry energy for long distances as one of the features of laser is collimation (can travel long distances).



The reflectors collect the solar energy from the space and transmit that collected energy to earth. The energy is received with the help of a microwave antenna. This project was discontinued when proposed in 1980 as the scientists knew too little to research on and couldn't invest in this idea as it was new. Currently, 100 million dollars is funded in research from all around the globe.

#### Reference:

[https://en.wikipedia.org/wiki/Space-based\\_solar\\_power](https://en.wikipedia.org/wiki/Space-based_solar_power)

**S. Iswarya**

**CSE-AI/ML 1<sup>st</sup> Year**



## iBand Lucid Dream

What if you could control your Dreams? Visit a beautiful island or go back in time of the age of the dinosaurs!!

IBAND is a EEG brain sensing headband for inducing lucid dreams and improving sleep. Now what is this lucid dream? so, a lucid dream is any dream in which you become aware that you're dreaming without you actually waking up. Dreams occur almost when you are in the rapid eye movement phase also known as the REM phase of your sleep. In this phase the brain activity is different than in other phases. IBAND senses accurately this dream by monitoring variations in your brainwaves. Once it senses the phase it plays audio visual cues. The subtle external stimuli of light patterns via LEDs on IBAND plus and sounds are appeared as exact in your dream making you aware that you are dreaming without them waking you up. Once you are lucid in a dream you can take control of your dream actions and consciously reshape the dream to fulfil any fantasy your wildest desires unrestrained by the laws of physics or society.



Once in lucid dream you enter a virtual world where everything you see, hear, touch and smell is authentic as reality. Lucid dreams can help with artistic, creativity problem-solving, improving sports and language skills and can even help people prone to nightmares to their fear under control sleep. IBAND also have the advanced smart alarm feature that wakes you up with simulated natural sunlight and sounds at the most optimum period of sleep cycle so that you wake fresh every time. It communicates



with IBAND plus app on your smartphone via Bluetooth so you can conveniently check your sleep statistics.

**Reference:**

<https://www.ibandplus.com/>

**Rithika Rupaji**  
**ECE-A 3<sup>rd</sup> Year**



## **AI Network Detecting Drunkenness by Evaluating IR Images**

There are more than a million deaths in the whole world each year from road accidents, a large percentage is because of drunkenness. Kha Tu Huynh and Huynh Phuong Thanh Nguyen of Vietnam National University of Ho Chi Minh City explained that earlier they were focused on developing by focusing on eye state, head position, or functional state indicators. But these factors make it less effective as they may affect the other elements.



A complex neural network can evaluate thermal infrared images of human faces and determine with 93% accuracy whether the person is drunk. The team points out that analysis of thermal imaging offers a less ambivalent approach that is also non-invasive and could allow the authorities to filter people where alcohol is likely to be consumed and people may opt to drive home. Also, the team points out that any system designed to identify drunk people must

have a meager rate of false positives and false negatives. A false negative might see a drunk person driving their car. In contrast, too many false positives would preclude sober drivers from using their vehicles. Optimizing the classification through larger training datasets on a diverse population of thermal images should bring it closer to the ideal, which would, of course, be theoretically unreachable with 100% accuracy with zero false positives, and zero false negatives.

**Reference :**

<https://techxplore.com/news/2022-10-ai-network-drunkenness-infrared-images.html>

**B. Chandana Sai**  
**CSE-A 3<sup>rd</sup> Year**



## **Silent Sound Technology**

Speaking on the phone can be challenging whether we're riding a bus or train because of the distractions. Therefore, we use a loud voice when speaking to someone on the phone. Silent Sound Technology is used for this to allow talking on the phone while driving.

The technology's primary job is to detect every lip movement and translate internal electrical pulses into acoustic waves. By reducing the ambient noise, these signals can be sent. People who find it difficult to talk clearly owing to background noise can make noiseless calls without disturbing others thanks to this technology. It is being developed at the "Karlsruhe Institute of Technology" and should be available soon.

A handset would interpret the movements of the lips by detecting muscle activity rather than producing any sounds, and then translate this into speech that the person on the other end of the conversation can hear. It basically scans your lips. Even we can disclose our PIN to a

dependable friend or relative without prying ears. The listener may clearly hear a voice on the other end. The amazing addition to this technology is that "it is an instant polyglot," meaning that gestures can be translated into the user's preferred language instantly. For languages like English, French, and German, this translation is accurate. But different tones can have a wide variety of meanings in languages like Chinese. This poses problem. In five or ten years this may be used in every-day's technology.

### **METHODS:**

Silent Sound Technology is processed through some ways. They are:

#### **1. Electromyography**

- The Silent Sound Technology uses electromyography, monitoring tiny muscular movements that occur when we speak.
- Monitored signals are converted into electrical pulses that can then be turned into speech, without a sound uttered.
- Electromyography(EMG) is a technique for evaluating and recording the electrical activity produced by skeletal muscles.
- An electromyography detects the electrical potential generated by muscle cells, when these cells are electrically or neurologically activated.
- Electromyographic sensors attached to the face records the electric signals produced by the facial muscles, compare them with pre-recorded signal pattern of spoken words
- When there is a match that sound is transmitted on to the other end of the line and person at the other end listen to the spoken words.

#### **2. Image Processing**

- The simplest form of digital image processing converts the digital data tape into a film image with minimal corrections and calibrations.

- Then large mainframe computers are employed for sophisticated interactive manipulation of the data.
- In the present context, overhead prospective are employed to analyse the picture.
- In electrical engineering and computer science, image processing is any form of signal processing for which the input is an image's the output of image processing may be either an image or a set of characteristics or parameters related to the image.
- Most image-processing techniques involve treating the image as a two-dimensional signal and applying standard signal-processing techniques to it.

### **Reference:**

<https://www.seminarsttopics.com/seminar/290/silent-sound-technology>



**Tammana Praveenya**  
**ECE-B 3<sup>rd</sup> Year**

### **Nicla Vision**

The Nicla Vision is a ready-to-use, standalone camera for analyzing and processing images on the Edge. This is ideal for building automation, industrial automation and prototyping applications.

Nicla Vision is a valuable tool for industrial automation, like tracking and counting the boxes on a pallet, identifying stock levels, reading bar/QR codes without the need for a computer. It can also be trained to read data from analog meters and send it to the Arduino IoT Cloud and can enhance the user experience in recognizing gestures and voice commands from users. Nicla Vision is a 2MP color camera and the intelligence it has is useful to process and extract useful information from anything it visualizes.



This device was programmable with Arduino (C++), Micro python (OpenMV), STM32Cube IDE and many more...



It can provide great solution in managing health and safety risks efficiently. This automatically checks if people are wearing safety devices like shoes, helmets and in identifying the authorized personnel using face recognition.

#### Features:

It is a Powerful microcontroller equipped with 2MP color camera, tiny form factor of 22.86 x 22.86 mm, STM32H747AI6 Dual ARM Cortex processor, Integrated microphone, distance sensor and smart 6-axis motion sensor, Onboard Wi-Fi and Bluetooth Low Energy connectivity, Standalone when battery-powered, expand existing projects with sensing capabilities, Enable fast Machine Vision prototyping.

#### Reference:

<https://www.arduino.cc/pro/hardware/product/nicla-vision>

**M. Lekhya Sri**  
CSE 4<sup>th</sup> Year



## Gravity Light

There are billions of people on earth who don't have electricity. So, there are a few simple inventions that will help them.

Jim Reeves and Martin Riddiford are co-inventors of Gravity Light. They spent four years trying to create a simple invention that would make electricity called Gravity Light, which is a light that requires no electricity, no batteries, or solar power to operate. Instead of all these, it just uses the force of gravity to create light. The Gravity Light was a gravity-powered lamp manufactured until 2019. It was called one of "The 25 Best Inventions of the Year 2013" by Time Magazine.

It works when a weight is connected to the end of a rope that loops through the light casing. The light is hung from any structure or tree. You pull on the rope to lift the weight into the casing.



When you let go off the rope, the weight gradually falls and pulls the rope through gears that turn a small generator to power LEDs on the light. This light shines for about 25 minutes, and it only takes 3 seconds to pull the rope to restart the cycle again. This simple invention helps a lot of people in giving light and reduces the usage of batteries and electricity. It is effective and inexpensive. Gravity light is a simple invention that could be a source of cheap light in developing markets.

#### Reference:

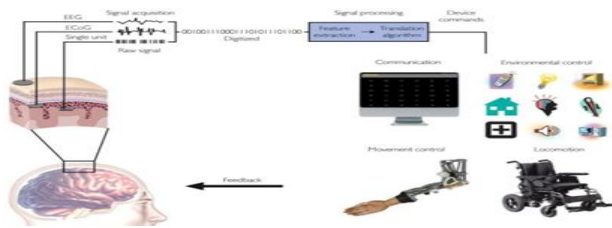
<https://www.inventor-strategies.com/simple-inventions.html>.

**G. Khadhyothi Sreeja**  
CSE 3<sup>rd</sup> Year



## Brain-Computer Interface

Brain-computer interfaces (BCIs) collect and process brain signals to create commands that are then sent to output devices to perform desired tasks. BCI's primary objective is to replace or recover functional function for patients with neuromuscular disabilities. To measure, process, and control brain activity, we need a device, a computer, and an application.



Electroencephalography, or EEG, was a common method of measurement in early BCI research because it is simple, secure, and affordable to obtain. The electrical signals are greatly reduced as they pass through the dura, skull, and scalp, which is the fundamental drawback of EEG. As a result, crucial information could be lost. Since ECoG activity is monitored from the cortical surface, an epidural or subdural electrode array must be implanted. ECoG has superior spatial resolution and spectrum breadth than EEG and records signals with a larger amplitude. The ECoG comprises higher-frequency (i.e., >40-Hz gamma band) activity up to 200 Hz and potentially higher in addition to the lower-frequency activity (40 Hz) that predominates the EEG. Only if researchers and developers work to address issues in three crucial areas—signal-acquisition hardware, BCI validation and adoption, and reliability - can the bright future of BCI be realised.

### Reference:

[https://en.wikipedia.org/wiki/Bra...ain%E2%80%93computer\\_inter...face](https://en.wikipedia.org/wiki/Bra...ain%E2%80%93computer_inter...face)

**M. Uma Harika Devi**  
ECE-B 3<sup>rd</sup> Year



## Mi Air Charge Technology

Global technology leader Xiaomi today introduced a brand-new form of charging – Mi Air Charge Technology. Revolutionizing the way wireless charging is currently done by allowing users to remotely charge their electronic devices without the use of cables or wireless charging stands. We are now living in the era of true wireless charging. The space positioning and energy transmission are at the heart of Xiaomi's remote charging technology. Five phase interference antennas that are built into Xiaomi's self-created isolated charging pile allow it to precisely locate smartphones. Through beamforming, millimeter-wide waves are sent directly to the phone from a phase control array made up of 144 antennas.

Xiaomi has created a miniature antenna array with an integrated "beacon antenna" and "receiving antenna array" for use in smartphones. A beacon antenna uses little power to broadcast positional data. In order to make the sci-fi charging experience a reality, the receiving antenna array, which consists of 14 antennas, converts the millimeter wave signal emitted by the charging pile into electric energy through the rectifier circuit.



Xiaomi's current remote charging technology can charge a single device at a rate of 5 watts from a distance of several meters. In addition, multiple devices can be charged simultaneously.

### Reference:

<https://www.mi.com/uk/discover/article/?id=1462&m=dis?id=1462&m=dis>

**Boorla Blessy**  
ECE-B 3<sup>rd</sup> Year



## E-Textiles

E-textiles are smart fabrics with incorporated digital electronic components. It is also known as electronic textile, smart fabrics, smart clothes, and smart garments. It can be used for wireless Communication, and have the ability to conduct energy. They have the capacity to detect External conditions and react to them in a predetermined manner.



Smart textiles are any textile goods that can act differently than a typical cloth and can usually fulfil a specific function. Smart Materials, conductive polymers, encapsulated phase change materials, shape memory materials, as well as other electrical sensors and communication tools, can all be used to create it. E-Textiles can be used by everyone, from the average civilian to the military personnel. It can be used to monitor Heart rate, temperature, respiration, posture and more. For a sports person, it can help to acquire data that can be used to improve their skills.

### How to use the smart shirt?

A soldier attaches sensors to his body and pulls the Smart shirt on, and attaches sensors to the Smart Shirt to use his new technology. A Plastic optical fibers and other specialty fibers are weaved throughout the shirt's actual fabric, giving the Smart Shirt its mother board-like functionality. A "signal" is transmitted from one end of the plastic optical fiber to a receiver at the other end in order to determine the precise position of a bullet entry. The soldier's Personal Status Monitor (PSM), which is worn at hip level, is where the emitter and receiver are attached. If the emitter's light is not received by the PSM and receiver, it means the soldier has

been shot and that the Smart Shirt has been penetrated.

The sensors built Inside the soldier's T-shirt and the sensors attached to the soldier's body, both of which are connected to the PSM, are used to monitor the soldier's vital signs, such as heart rate, temperature, respiration rate, and others. A medical triage unit located close to the battlefield receives an electronic transmission from the PSM instantly detailing the wound and the soldier's condition. Based on the strength of a soldier's heartbeat and respiration rate, the Smart Shirt can assist a doctor in determining the severity of his injuries. During the so-called "golden hour," when there are many Casualties, this information is essential for determining who needs aid immediately.

### Reference:

<https://en.wikipedia.org/wiki/E-textiles>

**Hari Sahithya**  
**ECE-B 3<sup>rd</sup> Year**



## Robotic Process Automation Technology

Robotic Process Automation is a software technology is a form of business' process automation technology based on metaphorical software robots or on artificial intelligence. Automation is the process of making a machine, devices, or system operate automatically.

This is adopted in many Industries as efficiency and productivity has increased It is used to reduce time, effort and cost. There are 3 major types of Robotics Process Automation:

- Attended Automation
- Unattended Automation
- Hybrid Robotic Automation

As there are many useful possibilities to use in our day-to-day life. It has some factors which causes some problems, one of the prominent disadvantages of RPA is Added Complexity and attrition.



*“Change is hard at the beginning, Messiest in the middle, Best at the end.”*

**-Robin S. Sharma**

**Reference:**

<https://www.techtarget.com/searchcio/definition/RPA>

**Snigdha Sunkara**  
**ECE 3<sup>rd</sup> Year**



### **Mega-Constellations of Satellites**

Can you believe even in the modern world one third of the global population have never used internet? The Global Connectivity Report 2022 shows that despite the progress made in the last 30 years, 2.9 billion people in the world still do not have access to the Internet.

Low Earth Orbit satellites are becoming a new space race to overcome this problem. Mega-constellations are systems utilizing thousands of satellites in Low Earth Orbit (LEO) to deliver low latency broadband data services anywhere on the planet. These LEO satellites operate close to Earth's surface with an altitude of up to 2,000km. A shorter trip is a faster trip, so the latency is lower for LEO satellites than for those farther out. And because signals can travel more rapidly through the vacuum than fiber-optic cables, LEO satellites have the potential to rival or possibly exceed the fastest ground-based networks.

Starlink is an LEO satellite constellation being constructed by SpaceX with a goal of providing internet access to everyone in the world. With an initial goal of 12,000 satellites orbiting the Earth, SpaceX has applied to launch another 30,000 Starlink satellites. Starlink was originally envisioned to offer satellite Internet connectivity to places with a lack of telecommunications infrastructure, such as at sea, in isolated locations far from cities, or in places suffering from governmental restrictions

on Internet access. Starlink was once activated across Ukraine in late February after Internet services were disrupted because of Russia's invasion and the terminals provided by Starlink have been used for battlefield communications.



All this is made possible thanks to the low cost of launching these nano-satellites, which weigh barely a few pounds and it has also enabled faster and flexible deployment which made satellite mega-constellations feasible. But in the future there is a possibility that if space becomes too crowded, there will be collisions that can trigger a catastrophic chain reaction of debris, causing yet more collisions.

**Reference:**

[https://www.washingtonpost.com/business/why-low-earth-orbit-satellites-are-the-new-space-race/2020/07/10/51ef1ff8-c2bb-11ea-8908-68a2b9eae9e0\\_story.html](https://www.washingtonpost.com/business/why-low-earth-orbit-satellites-are-the-new-space-race/2020/07/10/51ef1ff8-c2bb-11ea-8908-68a2b9eae9e0_story.html)

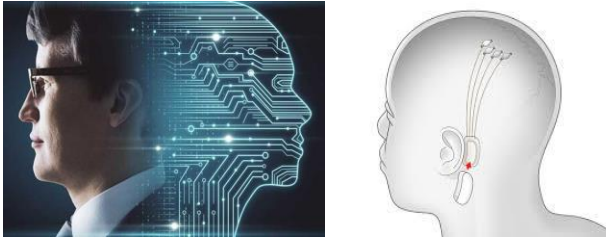
**Thopuri Harshitha**  
**CSE-AI/ML 3<sup>rd</sup> Year**



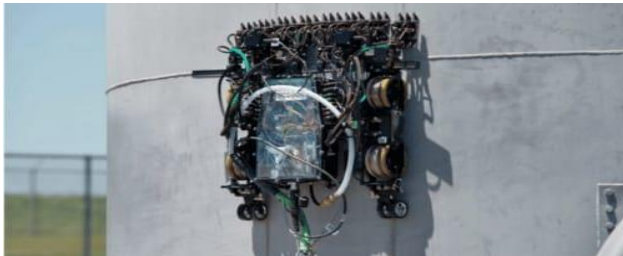


## How useful An Attachable Robot Would Be

Imagine if a robot can stick to any material, equipment or surface and scan for sign for degradation (the quality of something is destroyed or spoiled).



The spider like robots which are flexible and can move in any direction which is controlled by the remote. this is used to monitor the corrosion trends over time and it will predict it and help for future maintenance. This type of attachable robots is used in large industrial areas. where it can predict the corrosion or and damage of the equipment so that it will be easy to get maintained and check condition of that equipment.



This type of robotics are configured with ultrasonic transducers (the device which generate ultrasound energy), localization sensors and even HD cameras.

### Reference:

<https://www.electronicsforu.com/tech-zone/tech-of-robotics/imagine-how-useful-an-attachable-robot-would-be>

**T. Sreevally**  
IT-B 3<sup>rd</sup> Year



## Neuralink

It is a fascinating new technology that allows a piece of computing to directly interact with the brain. Few leading companies developing this kind of Brain-Machine Interface (BMI) are Neuralink, Emotiv, NextMind, BitBrain.

Currently, one of the biggest focuses of Neuralink is creating a fully operational BMI which they believe, the next step for humanity.

### What Neuralink Does?

Neuralink, in short is trying to develop an implant that can connect human brain with a computer or any mobile device. It involves inserting micro-scale threads that contain electrodes into areas of the brain which they claim will be able to record the neuron interactions, decode the information and transmit them to the computer.

This may sound like science fiction, but Neuralink believes that neural interactions can give us insights into what we see, feel and think.

**Neuralink Technology** aims to give people with paralysis the ability to communicate more easily via text or speech synthesis, or to express their creativity and to expand it to restore sensory, motor function.

Neuralink app is designed to control the devices with human brains. It could also change the way people use the creative process simply from their thoughts.

### Is It Safe?

Neuralink, ensures that safety is a key part of their design. But while dealing with inserting things (BMI) into the brain, safety is a major concern. According to many experts it is very tough to draw any conclusions about Neuralink right now.

### Reference:

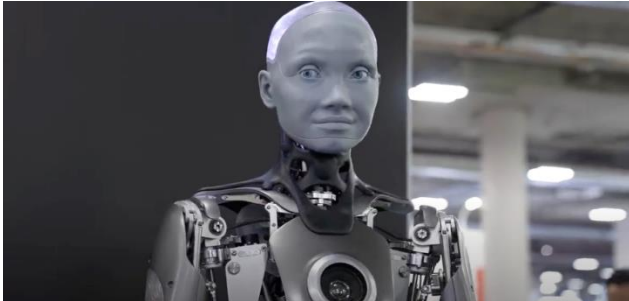
<https://www.insurdinary.ca/elon-musk-neuralink/>

**B. SreeVidhya**  
CSE-AI/ML 3<sup>rd</sup> Year



## The Humanoid Robot

Artificial intelligence (AI), specifically machine learning, is now considered one of the biggest innovations since the microchip. Some of the AI/ML applications are self-driving cars and automated transportation, image recognition etc.. In this article let's see about one of the most interesting displays of technology.



"Ameca" is a humanoid robot from UK company Engineered Arts. The robot looks and acts uncannily human, with realistic facial expressions and smooth movements without that buzzing sound you typically associate with robotic movements. The robot can reply, ask you how your day was and answer questions. A robot that can interact with visitors in a very natural way. It has plenty of features but something it can't do is walk. The company thinks in the future the robot could be used to help humans, maybe at a shopping centre or airport where the robot could help you with directions.



Robots can have a huge impact on a wide range of fields. Today, these robots can now think and are able to interact directly with humans, through

sensing neural and environmental signals, triggering movements in response.

### Reference:

<https://www.youtube.com/watch?v=LzBUm31Vn3k>



**P. Vennela Reddy**  
CSE III year

## Smart Lens

Smart Lens is a new technology that delivers drugs to the eye for treating a variety of diseases. This is an approach that increases the availability of a drug over conventional eye drops. These drug-eluting contact lenses are not only meant for more comfort but also deliver more medication into the eye than drops do.

This lens is engineered with vitamin E nano-barriers to extend drug release which helps in treating glaucoma (an eye disease that involves damage to the optic nerve and leads to blindness if it is not treated properly). For preventing the



drug leaving from the lens quickly, Vitamin E complexes act as barriers. Whenever the pressure inside the eye increases, there is a decrease in the gap between the upper and lower lenses. This is detected by the pressure sensor through a cantilever. Then the sensor sends a signal to the wireless system which subsequently produces the release of an anti-glaucoma drug, from a hydrogel attached to an electrode, and enables it to cross the cornea of the eye. The brimonidine drug acts to reduce the pressure within the eye.

Researchers have predicted several uses for this contact lens platform: as an antibiotic to cure corneal ulcers; to lower intraocular pressure in patients with glaucoma; to treat cystinosis and dry eye. This lens can also be used in vision-correcting contact lenses without the refractive component of the lenses being affected.

**Reference:**

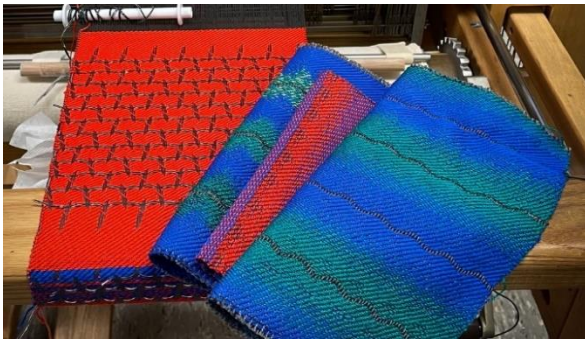
<https://www.opthalmologytimes.com/view/contact-lens-drug-delivery-glaucoma-better-way-get-there>

**G. Pavitraa**  
CSE-AI/ML 1<sup>st</sup> Year



## Fabric That Can Hear

Imagine sitting at home and receiving phone calls through your shirt. Sounds crazy? This scenario was possible because of the creation of acoustic fabric by the research engineers at the Massachusetts Institute of Technology and their collaborators at Rhode Island School of Design. They created a fabric with piezoelectric material along with some traditional yarn to produce an electrical signal when bent or mechanically deformed, providing a means for the fabric to convert sound vibrations into electrical signals.



It converts sound first into mechanical vibrations, then into electrical signals, similarly to how our ears hear. This fabric when woven as shirt's lining can detect the wearer's heartbeat features. It can capture sounds from a quiet library to heavy road traffic, and determine the precise direction of sudden sounds like handclaps. This fabric has a lot of applications such as it can be

embedded into buildings to detect cracks or strains, can be integrated with spacecraft skin to listen to accumulating space dust, can be used in maternity clothes to monitor a baby's heartbeat.

**Reference:**

<https://studyfinds.org/fabric-hears-heartbeat-mit/>

**Kasula Spandana**  
CSE-AI/ML 3<sup>rd</sup> Year



## Block chain Technology

In relation to cryptocurrencies like Bitcoin and the security it offers, block chains have gained popularity. However, it also provides security that has a number of additional uses. While many of us are familiar with Bitcoin, we are not familiar with block chains. Block chain is a technology that emerged along with the global adoption of Bitcoin. Additionally, this technology is closely related to the trading and banking industries. Data that can only be added to, not deleted or altered, is another method to describe a block chain. It produces several data segments that link together to form a "chain," hence the name "block chain."

Block chain is a very safe technology since current data cannot be changed or erased. Because block chains are consensus-driven, no



one individual or entity can gain control over the data. A third party is not required to supervise transactions.

The need for qualified block chain developers has grown as more sectors adopt and use block



networks. It demands practical programming language experience, foundational OOPS understanding, familiarity with flat and relational databases, data structures, networking, and web application development.

Reference:

<https://kriptomat.io/blockchain/>

**K.Dedeepya**  
**ECE-A 3<sup>rd</sup> Year**



## Android Package Kit (APK)

### •What Is an APK File and What Does It Do?

If you use an Android smartphone, you've probably encountered APK files before. Ever questioned what it is?

APK, or Android Package Kit, is an extension for Android Package files, which are used by Google's Android OS to distribute programs. It is comparable to the .exe files used by the Windows operating system to install programs.

We typically download apps from Play Store without ever recognizing the phrase APK. The reason for this is that Android handles the process of installing apps in the background. There are several websites that offer APK files for download if you know how to manually install the programs.

Software Tools to Open APK Files:

#1) WinRAR #2) WinZip #3) 7-Zip #4) Blue Stacks #5) You Wave #6) Google Android SDK

### Cons of installing APK files:

Even while it's simple to install APK files, they might not always be beneficial or secure.

Additionally, there have been cases when hackers have altered APK files to add additional program permissions. Users who utilize them without thinking about it could unintentionally

give sensitive personal information to cybercriminals.

Before downloading an APK files, users should thus look at some user comments or reviews before proceeding to download programs

Reference:

<https://www.makeuseof.com/tag/what-is-apk-file/>

**P. Latha Sri**  
**ECE-A 3<sup>rd</sup> Year**



## Do the Mushrooms talk ? If yes, about what?

Recent research says that mushrooms have the ability to talk to each other. Some of the fungi possess "Oscillations of extracellular electrical potential". The experiment was done on four different fungi – Ghost fungi (*Omphalotus nidiformis*), Enoki fungi (*Flammulina*



velutipes), Split gill fungi (*Schizophyllum commune*) and Caterpillar fungi (*Cordyceps militaris*). According to the findings, these fungi producing electrical impulses and these impulses are increasing when wood digesting fungi were in contact with wood. This means that the fungi are communicating about the food or injury through the electrical signals. The electrical impulses generated by the fungi are similar to that of human speech in terms of structure. The vocabulary of mushrooms includes about 50 words.



The Professor Adamatzky said the following about the research and things to be done in further research: -

- Fungi use spikes of electrical activity for communication and processing the information.
- Professor would group the spikes into words, provide linguistic and information complexity analysis of fungal spiking activity.
- The progressing research aiming to show that these distribution of word lengths match that of human languages.

Still the findings are going on and expecting good results.

**Reference:-**

<https://www.timesnownews.com/technology-science/researchers-find-mushrooms-can-talk-to-each-other-with-a-vocabulary-of-about-50-words-article-90700207>



**Kunta Vyshnavi**  
CSE – B 1<sup>st</sup> Year

**Flexible Display**

A flexible display or rollable display is an electronic visual display which is flexible in nature, as opposed to the traditional flat screen displays used in most electronic devices. Such screens can be rolled up like a scroll without the image or text being distorted. Technologies involved in building a rollable display include electronic ink, Gyricon, Organic LCD, and OLED. Electronic paper, curved OLEDs, Sony, Samsung mobiles etc are few examples.



Flexible electronic paper (e-paper) based displays were the first flexible displays

conceptualized and prototyped. Though this form of flexible displays has a long history and were attempted by many companies, it is only recently that this technology began to see commercial implementations slated for mass production to be used in consumer electronic devices.

Later Sony Electronics expressed interest for research and development towards a flexible display video display since 2005. In partnership with RIKEN (the Institute of Physical and Chemical Research), Sony promised to commercialize this technology in TVs and cellphones sometime around 2010. In May 2010 Sony showcased a rollable TFT-driven OLED display.

Samsung subsequently released the Galaxy



Round, a smartphone with an inward curving screen and body, in October 2013. One of the Youm concepts, which featured a curved screen edge used as a secondary area for notifications and shortcuts, was developed into the Galaxy Note Edge released in 2014. In 2015, Samsung applied the technology to its flagship Galaxy S series with the release of the Galaxy S6 Edge, a variant of the S6 model with a screen sloped over both sides of the device. During a developer conference in 2018, Samsung showed a foldable smartphone prototype, which was subsequently revealed in February 2019 as the Galaxy Fold.

OLEDs are the most commonly used components in latest inventions of flexible displays. It emits light due to the electroluminescence of thin films of organic semiconductors approximately 100 nm thick. Regular OLEDs are usually fabricated on a glass substrate, but by replacing glass with a flexible plastic such as polyethylene

terephthalate (PET) among others, OLEDs can be made both bendable and lightweight.

Though they are thinner, lighter and more flexible than the crystalline layers in an LED or LCD and have large fields of view, about 170 degrees, OLEDs have few drawbacks like flexible substrate itself as well as the process of bending the device introduce stress into the materials.

Many other latest inventions are being made based on this principle and the prototypes that are developed are also being modified to overcome the disadvantages. In future these flexible displays may replace the traditional flat screen displays with all the advantages and comfort they provide to the eyes of the viewers.

### Reference

[https://en.wikipedia.org/wiki/Flexible\\_display](https://en.wikipedia.org/wiki/Flexible_display)

**Chilakamarti Saigeethika**  
**ECE-B 3<sup>rd</sup> YEAR**



### Bio-Degradable Pots

Polythene bags used in Nurseries to propagate saplings have become a Single-Use Plastic which are harmful to the environment as it is non-degradable, takes years to disintegrate.

Srija, the 14-year-old girl is an innovator from Telangana made pots from groundnut shell. Srija is from Zilla Parishad High School in Chinthalakunta, Gadwal and she is trying to make a change for the betterment of the environment.

According to a report in The Better India, Srija made a planter pot out of groundnut shell. She used it to plant a sapling. The small pot was filled with soil and a neem sapling was fit into it. Srija and her mentor Augustien planted a sapling into the ground. They regularly checked the growth of the saplings and monitored the

time taken by planter(pot) to disintegrate. They found that the pot took only 20 days to disintegrate.



Groundnut cultivation is predominant in the Gadwal district. After a long research, Srija learned that the shells are rich in phosphorus and calcium and its powder can be used as manure as well. These shells were considered as agricultural waste. Groundnut grows on the upper-most layer of the soil, it can retain water and disintegrate over time. Srija managed to make a prototype of the pot by sourcing shells from a mill situated near her home. She grounded them in a mixer, converted it into a pulp, and moulded it onto a water bottle to form the shape of a pot. The first attempt was unsuccessful due to the fragile structure of the planter. Then her mentor helped her to make a stronger pot, by adding some extra natural ingredients. With her invention, Srija could get her entire school stop using plastics for tree plantation drives.

Srija's invention was given a grant by T-Works in Telangana. She also won the Council of Scientific and Industrial Research (CSIR) innovation award for her innovative and biodegradable solution.

<https://www.newindianexpress.com/states/telangana/2021/jan/07/telanganagirl-to-get-a-patentfor-groundnut-shell-pot-2246506.html>

**K. Mounika**  
**IT 3<sup>rd</sup> Year**









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**BVRIT HYDERABAD College of Engineering for Women**  
**Plot No. 8-5/4, Rajiv Gandhi Nagar Colony,**  
**Nizampet Road, Bachupally,**  
**Hyderabad-500090**  
**Phone: 040-42427773**  
**info@bvrithyderabad.edu.in**  
**principal@bvrithyderabad.edu.in**  
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