Adi Shankara
INSTITUTE OF ENGINEERING AND TECHNOLOGY

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Department Of

Electronics and Communication Engineering

GENESIS

IGNITING THOUGHTS

ISSUE 67 MONTHLY NEWSLETTER OCTOBER 2023

MISSION

- Inculcating leadership qualities, adaptability, and ethical values.
- Imparting quality education in the field of electronics, communication, and related areas to meet the challenges in the industry, academia, and research.
- Nurture the growth of each individual by providing a dynamic and conducive learning environment.

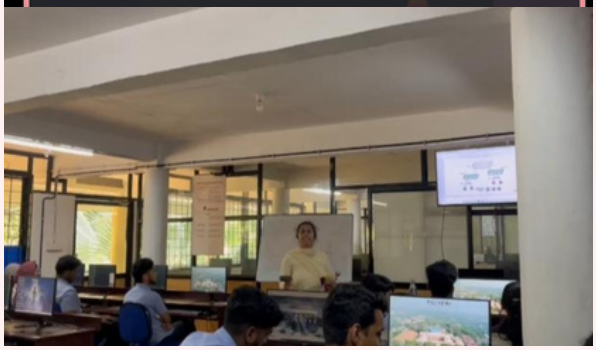
VISION

- To be recognized at the national and international level for excellence in Education and Research in Electronics and Communication Engineering.

At a Glance

Departmental Activities

ConnectX



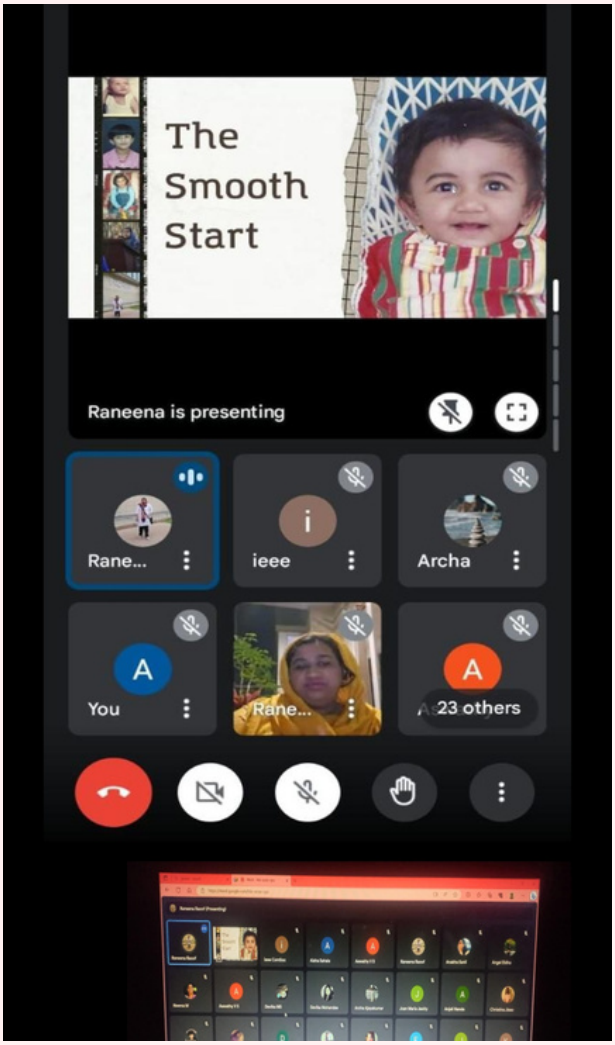
On October 10, 2023, the ConnectX program took place at the CCF Lab. It lasted for 6 hours and had an amazing audience of 47 participants.

A hands-on session on Cisco router and switch programming was hosted by the Communication Society of IEEE Student Branch ASIET on October 10th. The event, led by ME Founder and IT professional, Ms. Maya Menon, provided a comprehensive introduction to router programming, focusing on configuration, troubleshooting techniques, advanced routing protocols, security measures, and hands-on labs. Participants were guided through the process of configuring a Cisco router, including setting up basic parameters like IP addresses, routing protocols, and access control lists (ACLs).

The session also covered advanced routing protocols like OSPF and EIGRP, and how to configure and optimize these protocols. Participants also learned how to implement security measures using Cisco routers, including controlling access and implementing security features like VPNs. Following the session, participants engaged in a Q&A session, praising the clarity and depth of the content. The hands-on experience provided valuable insights and skills relevant to networking professionals and IT administrators.

Departmental Activities

BE HER



The IEEE Communication Society organized an empowering online webinar 'Be Her' focused on motivating and inspiring women in the tech industry on 6th of October from 7.30 pm to 8.30 pm through online platform. The session was handled by Raneena Raoof,M tech Student,PES University Indian representative IEEE PES day 2023, Secretary IEEE ComSoc YP Kerala.

The event commenced with a warm welcome, introducing the speakers and acknowledging the significance of supporting women in the tech field.Then the speaker delivered a captivating talk on the importance of women's participation in the tech industry and the impact they can make.She shared her personal journey and discussed strategies to overcome gender-related challenges. Her stories of perseverance and success served as a source of inspiration for the attendees.The event emphasized the importance of mentorship and networking in advancing one's career in tech. It provided resources and guidance on how women can build support systems within the industry.

An interactive Q&A session allowed participants to engage directly with the speakers, enabling them to seek advice and clarification on various topics related to women in tech.The talk left a lasting impact on the attendees, as evidenced by the feedback received. Many participants reported feeling more inspired, confident, and motivated to pursue their tech-related aspirations.

By the end,It was a resounding success, with a substantial turnout and enthusiastic participation. It served as a platform for women in technology to connect, learn, and grow. The event's positive impact is expected to inspire more women to pursue careers in tech and contribute to the industry's continued growth and innovation. The session was then concluded with the vote of thanks delivered by Ms. Aswathy V S, WIC Coordinator, IEEE ComSoc Society ASIET

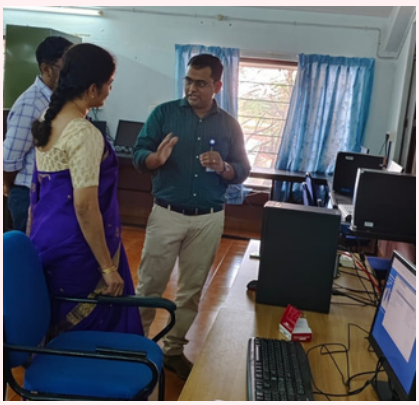
IEI Student Chapter

National Convention of Electronics and Telecommunication Engineers

National convention for Electronics and Telecommunication Engineers was organised by IEI on 27 and 28 October.The chief guest was Dr.S Somanath ,Chairman ISRO.Many leading persons from different organisations came and shared information of their projects. The students from Electronics and Communication department attended the conference along with faculty Dr.Reshmi .

Demo of RSM Project at IoT Lab

Exhibition of different RSM projects funded by KTU conducted by department of Electronics and Communication at Iot Lab on 26th October.



Sharing the happiness of success

congratulations to the following students of the 2020-2024 batch of ECE, for achieving an SGPA above 8 in the S6 KTU University Examination.

Sharing the happiness of success

Congratulations!

Congratulations to Dr.Bipin for getting promoted as Professor

Dr. Bipin P R

Professor
Dept. of ECE

Congratulations Archana miss for getting KTU PhD admission

Archana Aniyan

Assistant Professor
Dept. of ECE

Congratulations!

Congratulations on securing third in KTU D zone for Kabaddi competition held at KMEA Engineering College on 25th October.

NSS Volunteer Secretary Aparna Prasad of S5 ECE has been selected for 'Pre-Republic Day Parade Selection Camp' which is at Tamil Nadu.

Sharing the happiness of success

Congratulations !

Swetha P Mallaya of S7 ECE on getting placed at Intellipaat

Staff and student achievements

Staff Achievements

1. **Mrs. NEETHA K,** ASSISTANT PROFESSOR - Participation as TPC member and reviewer in 5th International Conference on Sustainable and Innovative Solutions for Current Challenges in Engineering and Technology- ICSISCET 2023 21-22 October 2023 Madhav Institute of Technology and Science, Gwalior
2. **Mrs. DIVYA V CHANDRAN,**ASSISTANT PROFESSOR - Particpated as PROGRAM COMMITTEE MEMBER & REVIEWER IN 2ND INTERNATIONAL CONFERENCE ON ADCIS 2023 SEP 21- 23 2023 BITS PILANI

Student Achievements

1. **Mr. ASIF IQBAL K**

- Attended a course on "TechXcelerate" conducted by GDSC on 21st September 2023

2. **Mr.ADITH K S**

- Attended a Quiz on Sustainable Engineering conducted by Department of Civil Engineering,ASIET on 15th September 2023
- Attended a workshop on "GIT & GITHUB" organised by GDSC on 19th September 2023
- Attended a workshop on "Prompt Engineering" conducted by GDSC on 20th September 2023

3. **Mrs. APARNA K S**

- Attended a workshop on "GIT & GITHUB" organised by GDSC on 19th September 2023
- Attended a workshop on "Prompt Engineering" conducted by GDSC on 20th September 2023

4. **MR.AKSHAY KUMAR M R**

- Attended a workshop on "Prompt Engineering" conducted by GDSC on 20th September 2023

Tech Talks

Artificial Intelligence and Digital Health Reshaping Global Eye Health

Dr. Ramu R
Associate Professor
ECE Department

The rapid evolution of digital health and artificial intelligence (AI) applications presents a unique opportunity to revolutionize eye health. These technologies have the potential to facilitate and expand access to eye care while supporting clinical decision-making through an objective, data-driven approach.

Early Detection and Diagnostics:

AI-powered diagnostic tools are at the forefront of revolutionizing early detection in eye health. Automated image analysis, driven by machine learning algorithms, allows for swift and accurate identification of ocular conditions. From diabetic retinopathy to glaucoma, these tools enable healthcare professionals to diagnose and intervene at the earliest stages, preventing irreversible damage and preserving patients' vision.

Teleophthalmology for Global Accessibility:

Digital health platforms are breaking down geographical barriers through Teleophthalmology. AI-driven telemedicine applications connect patients with eye care specialists, regardless of their location. This accessibility is particularly transformative in underserved regions, where individuals may face challenges in accessing regular eye check-ups. Teleophthalmology ensures timely consultations and interventions, promoting global eye health equity.

Personalized Treatment Plans:

Digital health in conjunction with AI facilitates the creation of personalized treatment plans for individuals with eye conditions. Analyzing vast datasets , AI algorithms consider patients' unique genetic profiles, lifestyle factors, and treatment responses. This personalized approach optimizes treatment outcomes, minimizes side effects, and enhances patient compliance, marking a shift from traditional one-size-fits-all methodologies.

Remote Monitoring and Disease Management:

The integration of digital health and AI enables continuous remote monitoring of patients with chronic eye conditions. Wearable devices and mobile applications equipped with AI algorithms track changes in visual health parameters. This real-time monitoring allows healthcare providers to intervene promptly when needed, offering a proactive and patient-centric approach to disease management.

AI in Surgical Innovation

AI is making significant contributions to surgical innovation in the field of ophthalmology. Robotic-assisted surgeries guided by AI enhance precision and improve surgical outcomes. From cataract surgeries to complex retina procedures, AI-driven surgical technologies are advancing the boundaries of what is possible, ensuring safer and more effective interventions.

An example of real-life deployment of AI-assisted diabetic retinopathy screening in primary care settings in Rwanda, a central African LMIC (low-income and middle-income countries), showed higher adherence to referrals generated by an AI system when compared with conventional grading by a human. AI assisted diabetic retinopathy screening facilitated by the Cybersight AI telehealth platform (Orbis International, New York, USA) enabled immediate diabetic retinopathy grading for referral recommendation, and also facilitated same-day ophthalmologist review and immediate eye health counseling (Figure 1).

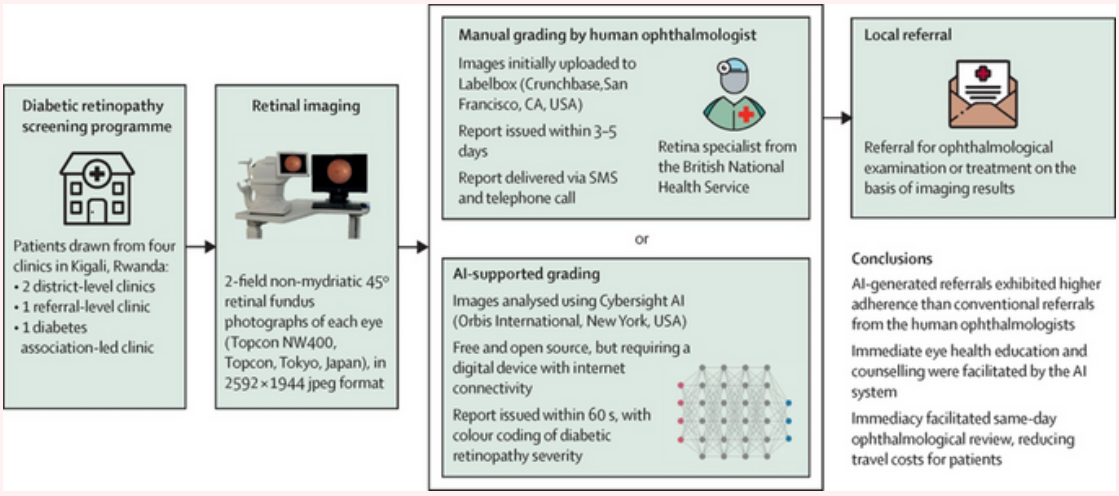


Figure 1. Real-life deployment of diabetic retinopathy screening using AI-supported grading versus human manual grading via a telehealth platform, in Kigali, Rwanda
Source: Mathenge W, Whitestone N, Nkurikiye J, et al. Impact of artificial intelligence assessment of diabetic retinopathy on referral service uptake in a low-resource setting: the RAIDERS randomized trial. Ophthalmol Sci 2022; 2: 100168.

Challenges impeding digital health integration

Health-care infrastructural limitations:

Resource limitations, especially in LMICs are another major barrier to implementation. Remote areas often lack the necessary infrastructure to adopt new technologies due to insufficient equipment, poor internet and electricity coverage and absence of robust telecommunication networks.

Financial costs

AI systems often depend on expensive hardware, such as retinal fundus cameras for image data acquisition, graphics processing units for running deep-learning algorithms, and stable high-speed internet connectivity. The short-term and long-term costs entailed by initial development, implementation, and maintenance of these systems represents a substantial barrier to entry for LMICs.

Cyber security risk:

Implementation of digital technology could introduce potential vulnerabilities for penetration and manipulation of confidential patient data. Strengthening of cyber security protocols and ethical development is required to mitigate these risks.

Ethical concerns:

Ethical AI development requires a priori consideration of the populations the new system is intended to operate on. It cannot be assumed that systems developed using data from one population could be transferred to another without a performance decrement. Overfitting during model training might limit performance, particularly if individuals come from populations unseen during training

Technical limitations:

AI and digital technology are not panaceas in global eye health. These technologies cannot replace all aspects of health care and are best framed as assistive tools to augment clinical management. Although diagnostic and management decisions might be clinically appropriate with adequate ocular imaging and ancillary tests, certain aspects of management require physical interaction or surgical intervention, and therefore face-to-face appointments cannot be abandoned.

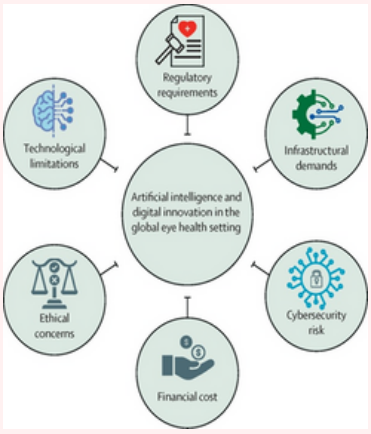


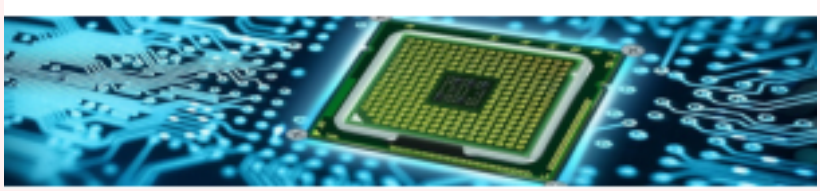
Figure 2: Summary of barriers to artificial intelligence and digital innovations in global eye health

Future Prospects

From enhanced diagnostics to personalized care and improved accessibility, these technologies are poised to redefine the standard of eye care worldwide. As research and innovation continue to unfold, the collaborative synergy between human expertise and technological advancements is steering the world towards a future where vision health is not just preserved but optimized through the transformative power of AI and digital health solutions.

Tech Talks

The Remarkable Evolution of VLSI Technology



Gopika Harikumar
S1 ECB

The world of electronics has witnessed an extraordinary evolution over the years, and at the heart of this transformation lies Very Large Scale Integration (VLSI) technology. VLSI has not only reshaped the landscape of modern electronics but has also become an inseparable part of our daily lives. In this article, we will explore the evolution of VLSI technology and its wide-ranging applications

The Birth of VLSI

VLSI technology was born out of the need for more compact and powerful electronic devices. In the early days of computing, electronic components were relatively large and consumed significant power. Engineers and scientists began to envision a future where thousands, even millions, of transistors could be integrated onto a single silicon chip. This vision gave rise to VLSI, which took a significant leap forward in the 1970s and 1980s.

Moores's Law and Scaling Down

A pivotal moment in the evolution of VLSI was Gordon Moore's famous observation in 1965, now known as Moore's Law. He predicted that the number of transistors on a microchip would double approximately every two years, leading to increased computing power and reduced cost per transistor. This prediction has held remarkably true over the decades, driving the relentless scaling down of electronic components.

The Evolution of Semiconductor Manufacturing

The field of Very Large Scale Integration (VLSI) technology has been and continues to be a critical driver of technological innovation. VLSI technology involves designing and fabricating integrated circuits with millions or even billions of transistors on a single chip. The future of VLSI technology holds several exciting possibilities and trends, including:

1. **Increased Integration**: VLSI technology will continue to push the boundaries of integration, leading to more complex and powerful microchips. This trend is driven by the demand for higher computational power, more functionality in smaller form factors, and lower power consumption.

2.**Advanced Semiconductor Materials**: The development and utilization of new semiconductor materials, such as advanced silicon-based materials, compound semiconductors, and 2D materials like graphene and transition metal dichalcogenides, will play a crucial role in improving the performance and energy efficiency of VLSI devices.

3. **Nanotechnology and Beyond**: Beyond traditional CMOS technology, we may see the adoption of novel nanoscale technologies, such as quantum dot-based devices or nanoscale interconnects. These technologies have the potential to revolutionize chip design and performance.

4. **Al and Machine Learning Acceleration**: With the increasing demand for artificial intelligence and machine learning applications, specialized hardware accelerators like GPUS, TPUs, and neuromorphic chips will continue to evolve, enabling more efficient Al processing.

5. **Optical Interconnects**: The integration of optical interconnects in VLSI chips can significantly enhance data transfer rates and reduce power consumption. This technology is still in development but holds great promise.

6. **3D Integration**: 3D chip stacking and interconnect technologies are becoming more prevalent, allowing for the integration of different functional blocks on separate layers of a chip. This can improve data transfer speeds and reduce the physical footprint of chips.

7. **Energy Efficiency**: Energy efficiency will remain a top priority. VLSI designers will continue to focus on reducing power consumption while improving performance. Techniques like near-threshold computing and more efficient power management will be employed.

8. **Security**: As more devices become interconnected, security becomes paramount. VLSI technology will need to address hardware security, including secure enclaves, tamper resistance, and encryption.

9. **Heterogeneous Integration**: The integration of diverse technologies and components on a single chip, such as sensors, memory, and processors, will become more common, enabling more specialized and efficient systems.

10. **Customization and Configurability**: VLSI technology will continue to evolve to allow for more customization and configurability. This can lead to application -specific integrated circuits (ASICS) and field- programmable gate arrays (FPGAs) becoming more versatile.

11. **Evolving Design Tools:** The development of advanced design tools and methodologies, including machine learning and artificial intelligence in chip design, will streamline the design process and improve chip performance.

12. **Environmental Considerations**: Sustainability and environmental concerns will influence VLSI technology. Efforts to reduce electronic waste and improve energy efficiency will be important.

The future of VLSI technology is promising, with innovations driven by the demand for more powerful and efficient electronic systems. However, it also faces challenges related to materials, manufacturing processes, and the need for constant adaptation to emerging applications and technologies. Researchers and engineers in this field will continue to play a crucial role in shaping the technology landscape.

Advancements in semiconductor manufacturing processes have played a crucial role in the evolution of VLSI technology. Shrinking transistor sizes and improving the efficiency of semiconductor fabrication have enabled the creation of highly complex integrated circuits. Techniques such as photolithography, chemical etching,and doping have been refined to nanoscale precision, allowing for the creation of ever smaller and more powerful chips.

Applications of VLSI Technology: The applications of VLSI technology are virtually limitless, and theypermeate every aspect of our lives. Here are some key areas where VLSI has made a profound impact:

Computing: VLSI technology has fueled the growth of computers,from room-sized mainframes to ultra-portable laptops and smartphones. It's the reason your smartphone can process complex tasks, from gaming to artificial intelligence.

Communication: VLSI is at the core of the telecommunications industry, enabling the development of high-speed data transmission and wireless communication technologies. Think about 5G and the tiny yet powerful chips inside your smartphone .

Consumer Electronics: Your television, digital camera, and home appliances all benefit from VLSI technology, resulting in energy- efficient and feature-rich devices.

Healthcare: Medical devices and imaging technologies, such as MRI machines and pacemakers, rely on VLSI for precise and efficient performance.

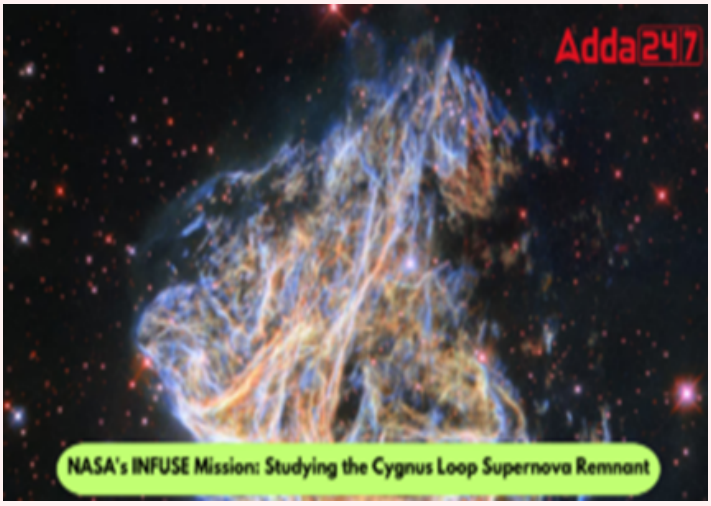
Transportation: Automotive industries use VLSI technology for advanced driver assistance systems, enabling features like autonomous driving and collision avoidance.
IoT: The Internet of Things (IoT) is rapidly growing, and VLSI is at the core of this revolution, powering smart homes, connected appliances, and more.

Space Exploration: Even space exploration has been influenced, with VLSI components powering satellites, rovers, and spacecraft for missions beyond Earth.

Challenges and the Future: While VLSI technology has revolutionized our world, it's not without challenges. As we continue to scale down components, issues related to power consumption, heat dissipation, and environmental impact become more prominent. The industry is also facing concerns about the end of Moore's Law, prompting researchers to explore alternative technologies like quantum computing.
In conclusion, the evolution of VLSI technology has been nothing short of remarkable. From the early vision of compact, integrated circuits to the pervasive applications in every facet of our lives, VLSI has shaped the modern world. It's a testament to human innovation, and as we look to the future, the challenges and opportunities of VLSI continue to unfold, promising even more astonishing developments in the world of electronics.

Tech News

NASA's INFUSE Mission: Studying the Cygnus Loop Supernova Remnant

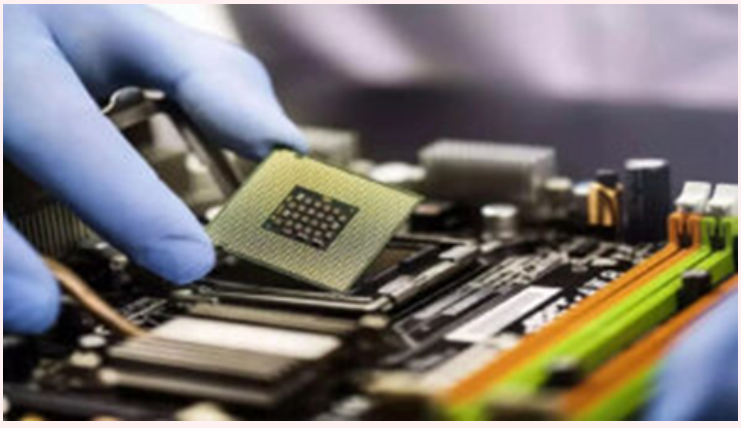


NASA recently launched a sounding rocket as part of its Integral Field Ultraviolet Spectroscope Experiment (INFUSE) mission. This mission aims to study the Cygnus Loop, a 20,000-year-old supernova remnant located 2,600 light-years away from Earth. The Cygnus Loop offers a unique opportunity to explore the life cycle of stars and gain insights into how new star systems form in the universe.

India's Deep Ocean Mission (DOM): Unlocking the Depths of the Ocean

India's Deep Ocean Mission (DOM) marks a significant stride in underwater exploration , aiming to delve 6,000 meters into the ocean depths . Spearheaded by the Ministry of Earth Sciences (MoES), DOM encompasses diverse pillars, each contributing uniquely to India's ambitious foray into the oceans.

India To Become A Chip Fabrication And Design Hub In The Next Five Years



During the 21st edition of the Hindustan Times Leadership Summit, Ashwini Vaishnav, the Union Minister for Electronics and Information Technology, outlined India's core strengths, growth potential, and key initiatives in the semiconductor and technology sectors. He also expressed his expectation that the global semiconductor market will double in the next 6-7 years, surpassing a trillion dollars in value.

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