

2025

Byte Fluent

INNOVATE • CODE • INSPIRE

ANNUAL MAGAZINE

TECHNOLOGY • INNOVATION • FUTURE



AI & MACHINE LEARNING

Intelligent
Tomorrow



CLOUD SOLUTIONS

Scalable.
Reliable. Secure.



CYBER SECURITY

Protecting
Digital World



SOFTWARE DEVELOPMENT

Building Better
Solutions



DATA ANALYTICS

Turning Data into
Decisions



EMERGING TECHNOLOGIES

Exploring New
Possibilities



Department Of Computer Engineering
Guru Daksh Govt. Polytechnic, Hisar

ABOUT US

The Department of Computer Engineering was established in the year 2004 with the intake of 60 students initially. It was increased to 120 in the year 2011. The Three Years Diploma Course in Computer Engineering awarded by Haryana State Board of Technical Education, Panchkula and approved by AICTE New Delhi. The department was started to meet the demand for well qualified computer professionals. The department has the pride in showcasing its 100% of admissions. The Department has well qualified and dedicated faculty for the betterment of the students. The department has a departmental library with more than 300 books and 6 e-journals. The department has well equipped seven computer labs having 200 computer systems with latest computer software and internet facility. Each lab is equipped with projectors for interactive teaching. The PHP lab has a teacher interactive board to conduct the workshops and seminar in the department.



COMPUTER ENGINEERING DEPARTMENT

Vision:

To create competent, excellent professionals by providing quality education in the field of Computer Engineering that meets ever challenging industrial and social needs.

Mission:

M1: To provide various trainings, guidance & counseling to the students for their overall development and placement.

M2: To improve industry collaboration through internship program & interaction with professional's society through Seminar/Workshop/Hackathon/Technical events

M3: To enhance the skills of employability and entrepreneurship through self learning and skills labs.

M4: To Provide a strong theoretical and practical background in Computer Engineering and train students to solve real world problems

Program Educational Objectives (PEO's)

PEO1: Develop a positive attitude towards lifelong learning and succeed in Industry, Higher Education or Entrepreneur endeavor.

PEO2: Apply the knowledge and skills to identify and solve real world problems

PEO3: To equip students with academic, innovative environment for a successful career as Computer Engineering and entrepreneurs

PEO4: To prepare the students to work as a committed professional with strong professional ethics & values, Societal cultural and environmental issues.

Program Outcomes (POs)

PO1: Basic and Discipline specific knowledge: Apply knowledge of basic mathematics, science and Computer Engineering- specific knowledge to solve the engineering problems.

PO2: Design/Development of solutions: Demonstrate the ability to design, development, and conduct experiments, interpret and analyze data and report results for well defined technical problems.

PO3: Engineering tools: Demonstrate the ability to model a live problem or a project that meets desired specifications and requirements using appropriate tools.

PO4: Engineering practices for society: Demonstrate the ability to understand the impact of Computer Engineering on society and incorporate them in engineering solutions

PO5: Sustainability and environment: Apply appropriate technology in context of environment and sustainable development.

PO6: Individual and team work: Demonstrate the ability to function in multidisciplinary or diverse environment as a member or leader of the team

PO7: Life-long learning: Ability to analyze individual needs and engage in updating in the context of technological changes.

Programme Specific Outcomes (PSOs)

PSO1: The ability to employ modern computer languages, tools, environments, and platforms in creating innovative career paths to be an entrepreneur, lifelong learner and to pursue higher studies and also to act as a good citizen by inculcating societal and environmental concerns.

PSO2: Ability to analyze, design, develop, enhance, tests, and maintain software that satisfies the specified requirements.

Editorial Team

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Faculty Members

1. Mr. Kapil Bhoria, Lecturer
2. Mr. Amit Kumar, Lecturer

Editor's Note

It gives us great pleasure and contentment to present *BYTE FLUENT* — a publication that has evolved into a genuine reflection of our department's ethos. It stands much more than a magazine; it is a testament to the curiosity, diligence, and creativity that our students and faculty bring to their academic pursuits and beyond.

This edition belongs to the students who wrote fearlessly and the faculty who nurtured that courage. Without your relentless spirit, these pages would be empty.

With appreciation,

The Editorial Team



HOD Message

It gives me immense pleasure to lead the department of Computer Engineering. The department has well qualified and eminent faculty. The main objective of department is to develop the students both personally and professionally to achieve successful career in Industry, and Academics. The magazine attempts to present the Department and its activities for general information to all concerned.

Dr. Mukesh Bansal

Head of Department
Computer Engineering



The Architects of Inspiring Futures and The Mentors of Tomorrow (Our Faculty Members)

From Left To Right :

- | | |
|-------------------------------|------------------------------|
| 1. Sh. Kapil Bhorla (Lect.) | 8. Dr. Mukesh Bansal (HOD) |
| 2. Sh. Rajesh Kumar (Lect.) | 9. Smt. Rekha Jangir (Lect.) |
| 3. Sh. Ravi Sangwan (Lect.) | 10. Smt. Rajbala (Lect.) |
| 4. Sh. Amit Kumar (Lect.) | 11. Dr. Ajit Kumar (Lect.) |
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| 6. Dr. Kulbhushan Bansal (SL) | 13. Sh. Munish Kumar (SL) |
| 7. Dr. Sanjeev Sharma (Lect.) | |

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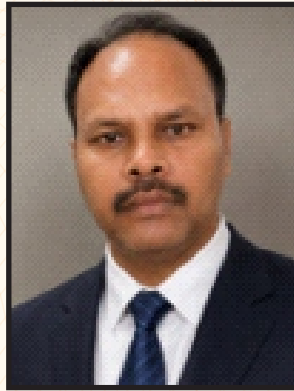
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COVID-19: The Turning Point that Shifted India into Digital Top Gear



Amit Kumar

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Guru Daksh Government Polytechnic, Hisar

ABSTRACT: While India's digital transformation had already begun before 2020, the COVID-19 pandemic became an unexpected turning point that accelerated the nation's digital journey at an unprecedented pace. What might have taken a decade to achieve was accomplished within a few years as citizens, businesses, educational institutions, and governments rapidly adopted digital technologies to maintain continuity during lockdowns.

1. Education: Learning Without Boundaries

The education sector witnessed one of the most dramatic transformations. Schools, colleges, and polytechnic institutes shifted to virtual classrooms through online platforms. Students from remote areas gained access to lectures, digital libraries, recorded sessions, and interactive learning tools. The concept of "learning anywhere, anytime" became a reality, transforming traditional pedagogical methods and opening new horizons for millions of learners across the country.

2. Healthcare: A Digital Revolution

Healthcare also underwent a digital revolution. Telemedicine emerged as a lifeline, allowing doctors to consult patients remotely. Digital health records, online appointments, e-pharmacies, and vaccine management systems transformed healthcare delivery. India's vaccination platform became a globally recognized example of how digital infrastructure can support public health on a massive scale, setting a benchmark for the world.

3. Business: Digital Resilience in Action

The business world rapidly embraced digital operations. Small shopkeepers who had never accepted online payments started using QR codes and digital wallets. Large corporations adopted remote working models, cloud computing, virtual meetings, and digital collaboration tools. The phrase "Work From Home" became a symbol of digital resilience, reshaping workplace culture and demonstrating the flexibility that modern technology enables.

4. Financial Technology: Cashless India

Financial technology experienced extraordinary growth. Digital payments became a daily

habit for millions of Indians. Street vendors, local retailers, transport operators, and service providers adopted cashless transactions. Today, a vegetable vendor in a village and a multinational company in a metropolitan city can participate in the same digital payment ecosystem — a testament to the inclusiveness of India's fintech revolution.

5. Governance: Transparent and Accessible Services

Government services also became more accessible through digital platforms. Citizens could apply for certificates, access welfare schemes, make payments, and receive essential information online. This increased transparency and reduced dependency on physical offices, making governance more efficient, citizen-centric, and responsive to public needs across both urban and rural India.

6. Agriculture: Empowering the Rural Farmer

Agriculture was not left behind. Farmers increasingly used mobile applications for weather forecasts, market prices, crop advisory services, and digital marketplaces. Technology helped bridge information gaps and improve decision-making in rural communities, ensuring that the benefits of India's digital leap reached the grassroots — the millions of farmers who form the backbone of the nation's economy.

7. The Psychological Shift: From Convenience to Necessity

Perhaps the most significant impact of the pandemic was psychological rather than technological. It changed public perception. Digital tools were no longer viewed as optional conveniences; they became essential instruments for education, employment, healthcare, communication, governance, and economic survival. This mindset shift is arguably the most enduring legacy of the COVID-19 era.

8. Conclusion: Crisis as Catalyst

The post-COVID era demonstrated that technology is not merely a support system — it is the backbone of a resilient society. The pandemic accelerated India's transition from a digitally emerging nation to a digitally empowered one. It shifted the country into top gear and created a foundation for the next generation of innovations in Artificial Intelligence, smart governance, Industry 4.0, digital entrepreneurship, and knowledge-based economic growth.

The lesson from COVID-19 is clear: nations that embrace digital transformation recover faster, innovate better, and build stronger futures. India's experience stands as one of the most compelling examples of how a crisis can be transformed into an opportunity for national digital advancement.

Cloud 3.0 – The Future of Intelligent Computing

Cloud computing has powered the digital world through storage and services on demand. Now, with AI, IoT, and 5G, we are entering Cloud 3.0 – the next phase of intelligent, decentralized computing. Unlike Cloud 1.0, which focused on virtualization, and Cloud 2.0, which brought scalability, Cloud 3.0 merges AI-driven automation, edge computing, and green infrastructure. Data is processed near the source, cutting latency to milliseconds. AI enables self-healing servers, predictive scaling, and real-time threat detection. Zero-trust security and carbon-aware data centers make it smarter and sustainable. Why It Matters for Computer Engineers.

Generation	Period	Core Idea	Limitation
Cloud 1.0	2006–2012	Virtualization, IaaS, Cost saving	High latency, centralized
Cloud 2.0	2013–2020	Hybrid cloud, Containers, Microservices	Limited real-time processing
Cloud 3.0	2021- till now	AI + Edge + Automation + Green Tech	Complex integration, skill gap

Cloud3.0 powers smart cities, autonomous vehicles, Industry 5.0, and remote healthcare. For diploma students, it opens new roles like Edge Architect, ML Ops, and Cloud AI Engineer. Projects can now use server less tools, IoT + edge AI, and digital twins to solve real problems. Challenges include skill gaps, data privacy under the DPDP Act, and complex integration. Yet by 2030, 75% of enterprise data will be processed at the edge. Cloud 3.0 shifts computing from “storing data” to “thinking with data.” For GP Hisar students, mastering it today means building tomorrow's smart infrastructure. The future isn't just in the cloud – it's in the intelligent cloud, everywhere.

Cloud 3.0 is defined by convergence. It merges cloud, AI, 5G, and edge into one intelligent fabric.

Author Name: Sunil Soni



The Power of Digital Marketing in the Internet Era

In today's digital world, marketing is no longer limited to newspapers, TV, or posters. Businesses now connect with people through smartphones, social media, websites, emails, and search engines. This modern way of promoting products and services is called Digital Marketing. From Instagram ads to YouTube promotions and Google search results, digital marketing influences what people buy, watch, and trust every day. For students, entrepreneurs, and professionals, understanding digital marketing is becoming an essential skill in the online economy.

What Is Digital Marketing, Really?

Digital Marketing is the process of promoting products, services, or brands using digital platforms and internet-based technologies. If traditional marketing is a loudspeaker, digital marketing is a smart conversation with the right audience. It helps businesses reach customers faster, measure results accurately, and build long-term relationships online.

How to Start Learning

1. Understand the basics: Learn key concepts such as SEO, keywords, branding, content creation, engagement, and online advertising.
2. Practice with tools: Explore platforms like Google Ads, Canva, WordPress, and social media business tools to gain practical experience.
3. Create content: Start a blog, YouTube channel, or Instagram page to understand how online audiences interact with digital content.
4. Study real campaigns: Observe successful marketing campaigns from brands to learn how businesses attract and retain customers.
5. Stay updated: Follow trends in AI marketing, influencer marketing, and changing social media algorithms to remain current in the field.

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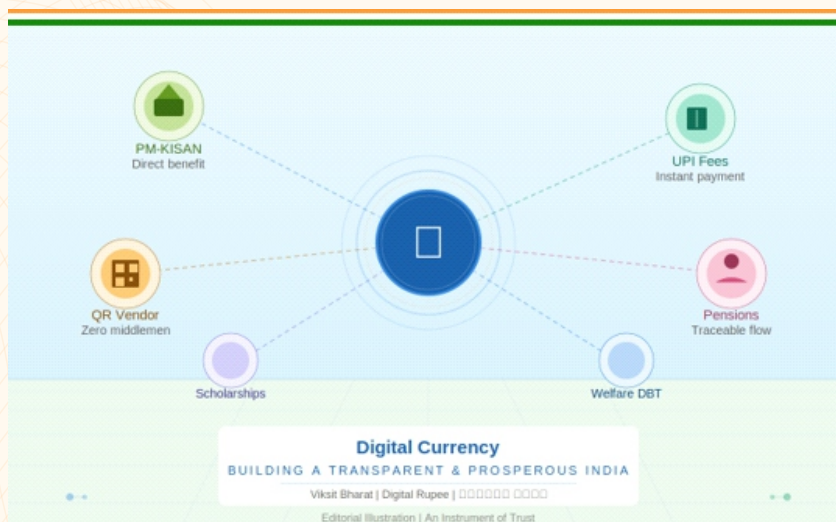
Digital Currency : Building a Transparent and Prosperous India

“Money has always shaped civilizations. Today, for the first time in history, civilization is beginning to reshape money.”

The 21st century is witnessing a quiet revolution. The way we earn, spend, save, and send money is changing at the speed of a smartphone tap. At the center of this shift is

Digital Currency — money that lives in code, not in wallets, and moves as fast as information itself.

For India, this is more than a tech upgrade. It is the foundation for a new economic era. Digital currency cuts transaction costs, removes paperwork, and brings millions of unbanked citizens into the formal economy. From a farmer in Mangali receiving PM-KISAN funds instantly, to a student paying college fees through UPI, the impact is already visible. The launch of the **Digital Rupee** shows India's intent to lead, not follow, in building a modern, globally competitive financial system.



The Transparency Dividend

Corruption thrives where cash is king and records are weak. Digital currency flips that script. Every transaction leaves a digital footprint — traceable, auditable, and permanent. When scholarships, pensions, and welfare benefits flow directly into bank accounts, the dark corners where money once leaked begin to disappear. Middlemen lose power. Accountability gains strength.

But technology is not a magic wand. A transparent ledger needs transparent institutions. Digital currency can light up the path, yet ethical governance, strong laws, and active citizens must walk it. Without public accountability, even the best tech can be misused.

The Road to Viksit Bharat

India's growth story will depend on how smartly we weave digital tools into daily life. Wider adoption of digital currency can rebuild trust in public systems, deepen financial inclusion, and make development more equal. A street vendor with a QR code and a scientist paid in Digital Rupee are both part of the same transformation.

“Corruption survives in the shadows of secrecy; digital currency brings financial activity into the light of accountability.”

India's journey to becoming a developed nation won't be measured only by GDP numbers. It will be judged by how fairly wealth is earned, how transparently it is shared, and how widely it lifts lives. In that journey, digital currency is not just a payment tool. It is an instrument of trust.

Editor's Note

The real success of digital currency will never be counted in crores of transactions. It will be measured by the trust it builds, the transparency it enforces, and the prosperity it spreads across every village, city, and classroom of India.

Author Name: Amit Kumar

Engineers: The Silent Architects of a Sustainable Future

What makes engineering particularly powerful is its ability to turn ideas into action. Scientists may identify a problem, policymakers may create regulations, but engineers build the practical solutions that bring change to life. They bridge the gap between vision and reality. When people think about solving global challenges such as climate change, pollution, or resource scarcity, engineers may not be the first professionals who come to mind. Yet, behind almost every sustainable solution that shapes our daily lives, there is an engineer working quietly to make it possible. As the world grapples with



environmental concerns and a growing population, engineers are being called upon not just to build for today, but to create solutions that will serve generations to come.

The role of engineers has evolved significantly over the years. It is no longer enough to design systems that are efficient and cost-effective. Today's engineers must ask a more important question: How can we meet human needs without compromising the planet's future?

One of the most visible examples is the rapid growth of renewable energy. Engineers are developing more efficient solar panels, stronger wind turbines, and advanced battery storage systems that make clean energy accessible to millions. These innovations are helping countries reduce their dependence on fossil fuels and move toward a greener future.

But sustainability is not limited to energy. Engineers are redesigning cities to be smarter and more livable. Green buildings that consume less electricity, intelligent traffic systems that reduce fuel consumption, and public transportation networks that lower carbon emissions are all examples of engineering solutions making a tangible difference. In many ways, engineers are shaping the cities of tomorrow before they even exist.

Water conservation is another area where engineering expertise is proving invaluable. Technology has further expanded the engineer's toolkit. Artificial intelligence, data analytics, and smart sensors are enabling real-time monitoring of energy use, pollution levels, and resource consumption. These tools help industries operate more efficiently while minimizing their environmental footprint.

As we look toward the future, sustainability will not be achieved through a single breakthrough or invention. It will require countless innovations, thoughtful designs, and responsible decisions. Engineers will be at the center of this transformation, applying their creativity and technical expertise to solve problems that affect people, communities, and ecosystems alike.

The sustainable future we often talk about is not something that will simply happen on its own. It is being designed, tested, and built everyday. And behind much of that progress stands an engineer—one of the silent architects helping to create a better world for us all.

Author Name: Rekha Jangir

Rise Green Computing

The rise of Green Computing has become one of the most important developments in the modern world of technology. As the use of computers, smart phones, servers, and the internet continues to grow, the consumption of electricity and the production of electronic waste have also increased rapidly. This situation created serious environmental problems such as pollution, high carbon emissions, and excessive energy usage. To reduce these harmful effects, the concept of Green Computing was introduced.

Green Computing refers to the environmentally responsible use, design, and disposal of computers and other electronic devices. Its main goal is to reduce energy consumption and minimize the negative impact of technology on the environment. Companies and organizations are now developing energy -efficient hardware such as low -power processors, LED monitors, and advanced cooling systems that consume less electricity while maintaining high performance.

One of the major reasons behind the rise of Green Computing is the growing awareness of climate change and environmental protection. Governments and international organizations encourage industries to adopt eco -friendly technologies and reduce carbon footprints. Many data centers now use renewable energy sources like solar and wind power to operate more sustainably. In addition, recycling and reusing electronic devices have become essential practices to control electronic waste, also known as e- waste.



Applications:

- ✓ **Energy-Efficient Data Centers** Modern data centers use advanced cooling systems, virtualization, and renewable energy sources to reduce electricity consumption. These green data centers help companies save energy and lower carbon emissions.
- ✓ **Cloud Computing** Cloud computing reduces the need for multiple physical servers and computers. By sharing resources through the internet, organizations can save power, storage space, and hardware costs.
- ✓ **Virtualization Technology** Virtualization allows multiple operating systems and applications to run on a single server. This reduces the number of physical machines required and helps conserve energy.
- ✓ **Renewable Energy Integration** IT companies are now using solar panels, wind energy, and other renewable resources to power offices and data centers, reducing dependence on fossil fuels.

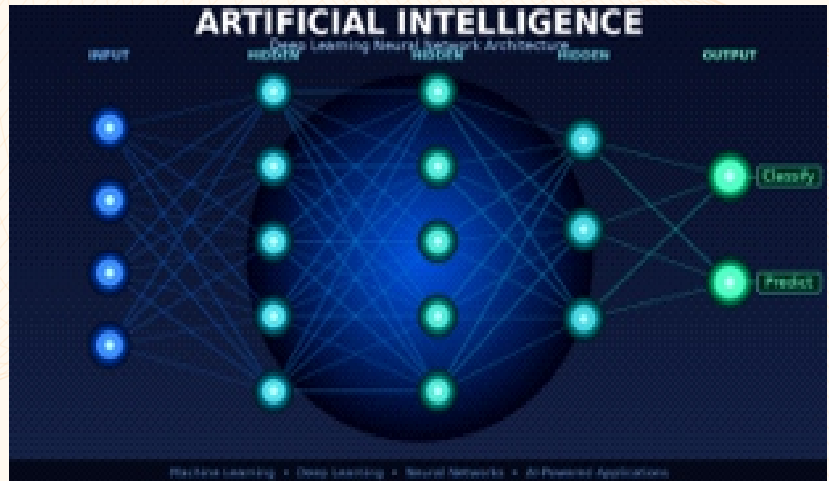
Green computing is used in data centers, offices, schools, hospitals, and industries to reduce energy consumption and electronic waste. It helps save electricity through energy - efficient devices, cloud computing, virtualization, and recycling of computer parts. Green computing also supports environmental protection, lowers operational costs, and promotes sustainable and eco -friendly technology usage worldwide.

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Artificial Intelligence – Beyond the Sci-Fi Hype

Artificial Intelligence (AI) is no longer a futuristic concept reserved for science fiction movies; it is actively rewriting the rules of the tech industry. For a Computer Engineering student, understanding AI is no longer optional – it is a core literacy. At its heart, AI is about building systems that can simulate human intelligence: learning from data, reasoning through complex problems, and adapting to new inputs.

Instead of writing rigid, line-by-line instructions, engineers today design algorithms that discover patterns on their own. This shift is powered by Machine Learning (ML) – a subset of AI where systems improve their performance as they consume more data – and Deep Learning, which uses multi-layered neural networks modeled loosely after the human brain to process complex inputs like images and spoken language.



[Raw Data] ---> [Machine Learning Model] ---> [Automated Insights] ^ | (Continuous Feedback & Tuning)

The industry heavily relies on practical implementation. Python has become the undisputed language of AI, supported by powerful, accessible libraries like TensorFlow, PyTorch, and Scikit-Learn. The career landscape for those with practical AI skills is expanding rapidly. Companies are looking for hands-on professionals who can deploy models, clean and organize data, and integrate intelligent features into everyday web and mobile applications. Focusing on building intelligent apps – like a smart diagnostic tool, an automated sorting system, or a predictive maintenance tracker – is an excellent way to stand out to employers and bridge the gap between academic theory and real-world engineering.

Author Name: Munish Kumar

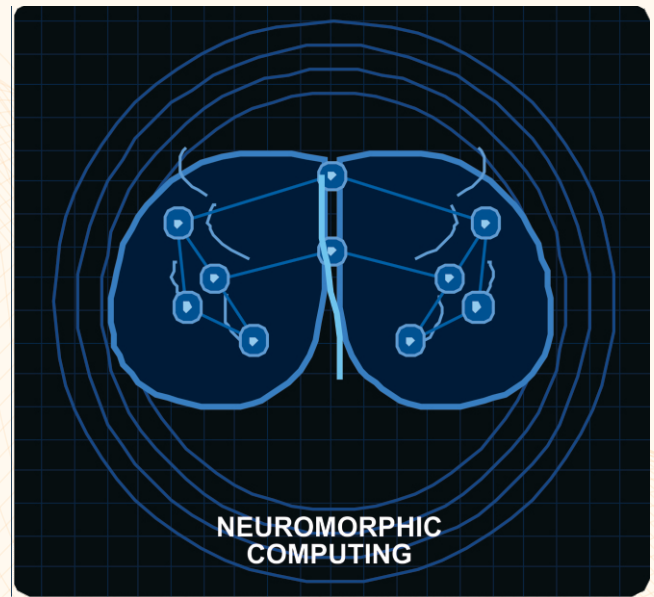
Neuromorphic Computing : The Next Brain of Technology

Neuromorphic computing is one of the most revolutionary and energy-efficient technologies of the modern era. Unlike traditional computers that process data step by step, neuromorphic chips use artificial neurons and synapses to process information in parallel — exactly like the human brain.

The human brain has 86 billion neurons connected by 100 trillion synapses, yet runs on only 20 watts of power. Neuromorphic systems aim to replicate this incredible efficiency for use in computers, AI, and smart devices.

This technology combines neuroscience, physics, and computer science to build chips that learn, adapt, and respond in real time — without needing massive amounts of power or internet connectivity.

Companies like Intel (Loihi 2 chip), IBM (TrueNorth), and BrainScaleS in Europe are actively building neuromorphic processors that outperform traditional GPUs at a fraction of the energy cost.



Applications:

- **Cybersecurity:** Real-time anomaly detection and intrusion prevention using brain-like pattern recognition.
- **Edge AI & IoT:** Smart devices run powerful AI locally — no internet needed — using neuromorphic processors.
- **Natural Language Processing:** Ultra-low power speech and language understanding for always-on assistants.
- **Autonomous Vehicles:** Instant sensory processing for self-driving cars and drones, reacting faster than humans.
- **Healthcare:** Brain-inspired chips can model neural disorders and assist in drug discovery research.

Neuromorphic computing is expected to become the next revolution in computer science. By 2030, these chips will power AI at the edge, redefine cybersecurity, and enable machines to think and respond like humans. Students and professionals in IT must begin exploring this technology today to remain competitive in the future digital world

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Bioinformatics: Technology in Healthcare

Bioinformatics is an exciting interdisciplinary field that combines Biology, Computer Science, Mathematics, and Statistics to analyze and interpret biological data. It plays a crucial role in modern healthcare by helping researchers understand diseases, develop medicines, and decode the human genome. With the rise of big data and artificial intelligence, bioinformatics has become one of the most important technologies in the medical and life sciences sector.

Bioinformatics uses powerful computer algorithms and software tools to process massive amounts of biological information. Scientists use it to compare DNA sequences, study protein structures, predict gene functions, and understand how diseases spread. Without bioinformatics, tasks that would take years to complete manually can now be done in hours.

The Human Genome Project, one of the greatest scientific achievements, was made possible through bioinformatics. By mapping all human genes (approximately 3 billion base pairs), researchers gained valuable insights into genetic disorders, hereditary diseases, and potential treatments.

Two important concepts in bioinformatics are:

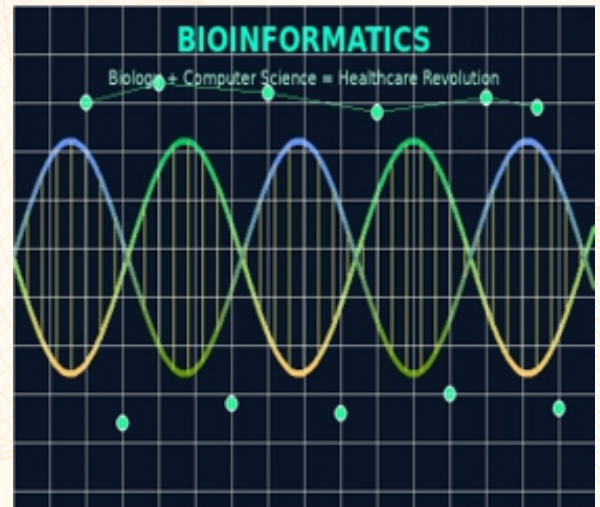
Sequence Alignment: Comparing DNA, RNA, or protein sequences to find similarities and differences between species or individuals.

Genomic Data Mining: Using machine learning and AI to extract useful patterns from large biological datasets. These capabilities allow researchers to discover new drugs, identify cancer biomarkers, and develop vaccines at unprecedented speeds.

Drug Discovery: New medicines can be designed computationally before lab testing, saving billions in research costs. **Pandemic Response:** During COVID-19, bioinformatics tools helped scientists sequence the virus genome within days. **Career Growth:** Roles such as bioinformatics analyst, genomic data scientist, and clinical data engineer are in high demand globally.

Applications:

- **Drug Discovery:** Computer-aided design of medicines and vaccines for faster development.
- **Genomics and DNA Analysis:** Sequencing and analyzing genomes to understand hereditary diseases.
- **Cancer Research:** Identifying tumor biomarkers and designing targeted therapies using genomic data.
- **Personalized Medicine:** Tailoring medical treatment based on a patient's genetic profile.
- **Epidemiology:** Tracking and predicting disease outbreaks using biological and population data.



Author Name: Priyanka

Roll No. 240040825010

Quantum Computing: The Future of Cyber Technology

Quantum computing is one of the most advanced and powerful technologies of the modern era. Unlike traditional computers that use bits (0 and 1), quantum computers use qubits, which can exist in multiple states at the same time. This special ability allows quantum computers to solve complex problems much faster than classical computers.

Quantum computing has the potential to transform many fields such as cyber security, medicine, artificial intelligence, banking, weather forecasting, and scientific research. Companies like IBM, Google, and Microsoft are actively working on developing powerful quantum systems for the future.

Quantum computing is a new type of computing technology based on the principles of quantum mechanics. Traditional computers process information step by step, while quantum computers can process many possibilities simultaneously.

Two important concepts of quantum computing are:

Superposition: A qubit can represent both 0 and 1 at the same time.

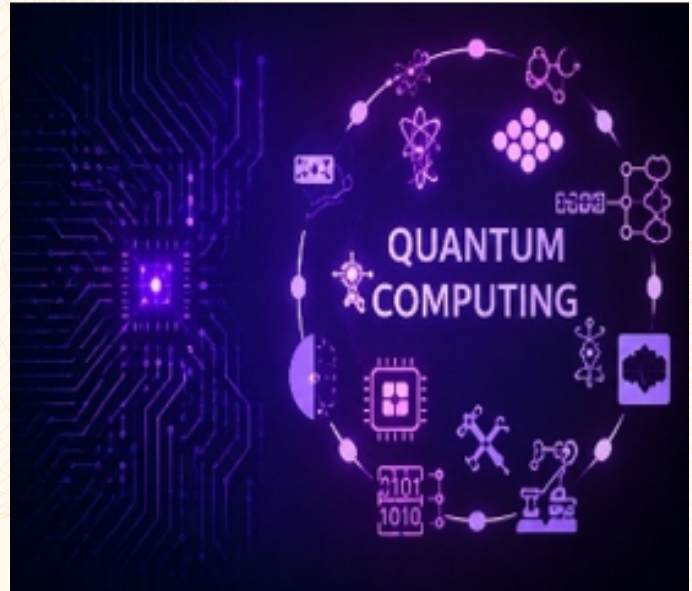
Entanglement: Qubits can connect with each other and share information instantly. These features make quantum computers extremely fast and efficient for solving difficult calculations.

Future Technology: Quantum computing is expected to become the next revolution in computer science. **Cyber Security Impact:** Quantum computers may break traditional encryption methods, leading to the development of stronger security systems. **Career Opportunities:** Careers such as quantum researcher, software developer, and cyber security expert will grow rapidly in the future. **Scientific Advancement:** Quantum computing can help discover new medicines, improve AI, and solve complex scientific problems.

Applications:

- **Cyber Security:** Development of advanced encryption and secure communication.
- **Healthcare:** Faster drug discovery and medical research.
- **Artificial Intelligence:** Improved machine learning and data analysis.
- **Finance:** Better risk analysis and fraud detection systems.
- **Weather Forecasting:** More accurate climate and weather predictions.

Quantum computing is not just a futuristic idea; it is becoming a reality. Although the technology is still developing, it has the power to change the world of computing and cyber security completely. Students and professionals should start learning about quantum computing to prepare for the future digital world.



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Roll No. 2400408000122

Data Science: The Power Behind Modern Technology

Data Science is one of the fastest-growing and most powerful technologies in the modern world. It is the process of collecting, analyzing, and understanding data to find useful information and make better decisions. In today's digital era, a huge amount of data is generated every day through social media, online shopping, banking, healthcare systems, and mobile applications. Data Science helps organizations manage this large amount of information efficiently and accurately. It combines different fields such as statistics, programming, artificial intelligence, and machine learning to solve complex problems quickly.



Data Science is widely used in many sectors like healthcare, education, finance, cyber security, business, and weather forecasting. In healthcare, it helps doctors

predict diseases and improve medical research. In banking and finance, it is used for fraud detection and risk analysis. E-commerce companies use Data Science to recommend products according to customer interests. Companies like Google, Microsoft, Amazon, and Netflix use Data Science to improve their services and customer experience.

Data Science also creates many career opportunities such as data scientist, data analyst, machine learning engineer, and AI specialist. As technology continues to grow, the demand for skilled data professionals is increasing rapidly. Data Science is not only shaping the present but also building the future of smart technology and innovation. Students should start learning Data Science because it will play an important role in the future digital world.

Applications of Data Science:

- Healthcare: Disease prediction and faster medical research.
- Banking and Finance: Fraud detection and risk analysis.
- E-commerce: Product recommendations and customer analysis.
- Education: Smart learning systems and student performance tracking.
- Cyber Security: Detecting online threats and improving security systems.
- Weather Forecasting: Better climate and weather prediction.

Author Name: Rajiya
Roll No. 240040800098

Hey fellow coders and tech enthusiasts! When we sit down in the computer labs or our hostel rooms, the first thing we do is connect to the local network. For us, a Wi-Fi router is just a Layer 2 or Layer 3 device on the OSI model that serves packets, routes traffic, and helps us fetch data from GitHub or stream videos. We think we are completely secure if we use incognito mode, turn off our smartphone GPS, or put a piece of tape over our webcams.

However, recent breakthroughs in network security have revealed a massive privacy loophole that completely bypasses your device security. Research shows that standard, off-the-shelf Wi-Fi routers can track your physical movements and body posture with terrifying accuracy, even if you are not carrying a single electronic device.

Appending Data on Invisible Waves: How It Works

As Computer Science students, we understand that data transmission relies entirely on physics. Wi-Fi operates on 2.4 GHz and 5 GHz radio frequencies, filling up our rooms with continuous, invisible electromagnetic waves. When a human body moves through an enclosed space, it acts as an obstruction. Our flesh and bones absorb, reflect, and scatter these radio waves, creating micro-distortions in the signal environment.

The real security threat lies in a standard protocol feature called **Beamforming Feedback Information (BFI)**. Introduced heavily in Wi-Fi 5 and Wi-Fi 6 standards, beamforming allows a router to detect where a client device is located so it can shape and focus its signal directly toward that device rather than broadcasting it in a wide circle.

The loophole is that these BFI frames are continuously transmitted through the air completely unencrypted. Malicious actors can capture these raw packets using basic network sniffer tools. By extracting the Channel State Information (CSI) from these packets, they can map exactly how the physical environment is changing in real-time.

The Intersection of Networking and Machine Learning

Extracting messy radio distortions from the air is one thing, but turning it into a visual image is where our core domain—Machine Learning—comes into play. Researchers fed this raw packet data into deep learning neural networks. The AI was trained to recognize how different physical shapes and movements distort the wireless signal.

The results are both brilliant from an engineering perspective and deeply alarming from a privacy standpoint:

- **Radio Imagery:** The AI transforms the wave distortions into 2D and 3D shapes. It functions exactly like a camera, but it requires zero light and can seamlessly see through thin walls.
- **99.5% Identification Accuracy:** In controlled testing environments involving nearly 200 subjects, the AI models analysed unique gait patterns, walking speeds, and body postures. It successfully identified specific individuals with an astonishing 99.5% accuracy rate purely based on how they walked through the Wi-Fi field.

- **The De-anonymization Risk:** While a router does not inherently know your legal name, a hacker can easily write a script to cross-reference this movement data with public location history logs or compromised smartphone data to unmask your identity.

The Blueprint for Tomorrow's Network Security

This vulnerability highlights a critical lesson for our generation of developers and software engineers: functionality often races far ahead of security. When the IEEE committee designed the beamforming feedback protocols to optimize data speeds, they did not anticipate that the feedback packets themselves could be weaponized to map physical human movement.

As future tech professionals, the responsibility to patch these vulnerabilities falls on us. The industry desperately needs software solutions that inject noise into BFI packets to confuse tracking algorithms without degrading network performance. Until enterprise-level firmware encryption becomes a mandatory global standard across all hardware manufacturers, the digital world remains highly exposed. We must transition from treating wireless signals as mere data pipelines and begin securing them as active, environmental sensors.

Author Name: Ravi Sangwan



Dark Web: The Hidden Internet

The internet has become one of the most important parts of modern life. People use it daily for communication, education, entertainment, shopping, banking, business, and social networking. However, the internet that normal users access through search engines like Google and Bing is only a small portion of the entire digital world. Beneath the visible internet lies a hidden network known as the **Deep Web**, and within it exists the mysterious and highly secretive section called the **Dark Web**. Because of its hidden nature and anonymous environment, the Dark Web is often referred to as the “Hidden Treasure of the Internet.”

The Dark Web is a part of the internet that cannot be accessed through ordinary web browsers. It requires special software such as **Tor (The Onion Router)**, which helps users hide their identity and location by encrypting internet traffic through multiple layers of security. This technology provides anonymity and privacy, making it difficult to track users or monitor their online activities. Due to this feature, the Dark Web has become both a useful technological platform and a dangerous digital space.

One of the major purposes of the Dark Web is to provide secure communication and freedom of expression. Journalists, researchers, activists, whistleblowers, and cybersecurity experts use it to share confidential information safely without fear of censorship or surveillance. In countries where internet freedom is restricted, the Dark Web helps people communicate freely and access uncensored information. It is also used by security professionals and government agencies to monitor cyber threats and investigate online crimes.

Despite its useful applications, the Dark Web is also widely known for illegal and unethical activities. Criminals misuse the anonymous nature of the Dark Web for hacking, cybercrime, fake identity creation, illegal marketplaces, drug trafficking, financial fraud, cryptocurrency scams, and the selling of stolen personal data. Many cybercriminals use hidden websites to spread malware, ransomware, and leaked databases, creating serious threats for individuals, companies, and governments around the world. This dual nature makes the Dark Web both fascinating and dangerous at the same time.

The internet is generally divided into three main layers:

1. Surface Web

This includes websites that are publicly accessible through search engines such as Google, YouTube, Facebook, and news websites. It is the part of the internet most people use every day.

2. Deep Web

The Deep Web contains private and password-protected information such as banking records, medical reports, academic databases, government documents, and cloud storage. It is much larger than the Surface Web.

3. Dark Web

The Dark Web is a hidden section of the Deep Web that uses encrypted networks and special browsers like Tor. Websites on the Dark Web usually have “.onion” domains and remain invisible to normal users and search engines.

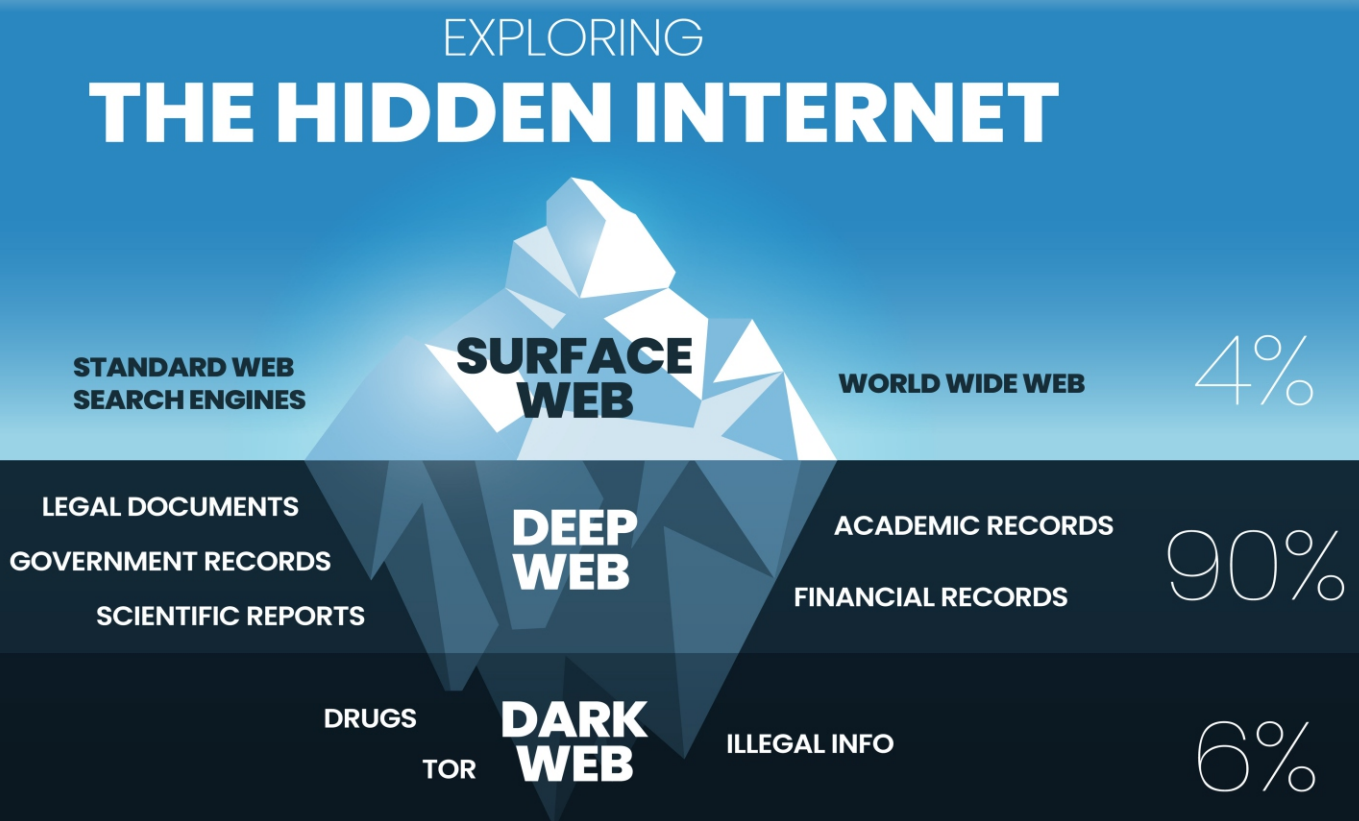
The Dark Web also has a strong connection with **cryptocurrency**, especially Bitcoin, because digital currencies allow anonymous transactions. While cryptocurrencies support innovation in online payments, they are also frequently used in illegal Dark Web marketplaces.

This article explores the structure, working, uses, advantages, disadvantages, and real-world impact of the Dark Web. It highlights the importance of cybersecurity, online privacy, ethical internet usage, and digital awareness in today's technology-driven world. The paper also explains how the Dark Web represents both the advancement of internet technology and the darker side of cyberspace.

In conclusion, the Dark Web is a mysterious hidden world of the internet filled with secret information, privacy tools, hidden opportunities, and advanced technologies. At the same time, it also contains serious cyber threats and illegal activities. Therefore, understanding the Dark Web is important for students and technology users because it increases awareness about online safety, cybersecurity, and the hidden realities of the digital age.

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BCI : Brain-Computer Interface

A Brain-Computer Interface (BCI) is a revolutionary technology that creates a direct communication pathway between the human brain and external devices such as computers, robotic limbs, or digital systems. By capturing electrical signals from the brain, BCIs allow people to control machines purely through thought, without any physical movement. This technology holds immense potential for transforming healthcare, communication, and human capability.



BCIs work by detecting brain activity using sensors placed on or inside the skull. These signals are then processed by computer algorithms, which translate them into commands. Non-invasive BCIs use electrodes placed on the scalp (EEG-based), while invasive BCIs involve implanting microelectrode arrays directly into brain tissue for higher precision and signal quality.

The most significant application of BCI technology is in assisting individuals with paralysis, ALS, or locked-in syndrome, enabling them to communicate and interact with the world. Companies like Neuralink, Synchron, and Brain Gate are leading this research frontier with promising clinical trials.

Two key concepts in BCI research are:

Signal Acquisition: Recording brain signals through EEG (non-invasive), ECoG (semi-invasive), or intracortical electrodes (invasive).

Neural Decoding: Using AI and machine learning algorithms to interpret brain signals and convert them into meaningful commands for devices.

Medical Rehabilitation: BCI systems help stroke and spinal cord injury patients regain motor control. **Assistive Communication:** Patients with ALS can type or speak using only their brain signals. **Gaming and VR:** BCIs are being explored for immersive hands-free gaming experiences. **Mental Health:** BCIs can monitor brain patterns to detect anxiety, depression, and epilepsy in real time.

Applications:

- **Medical Rehabilitation:** Helping paralysis and stroke patients control robotic limbs or wheelchairs through thought.
- **Assistive Communication:** Enabling non-verbal patients to communicate by translating brain signals into text or speech.
- **Neurological Monitoring:** Detecting and predicting epileptic seizures, depression, other brain disorders in real time.
- **Military and Defense:** Developing soldier-machine interfaces for controlling drones and equipment hands-free.
- **Gaming and Entertainment:** Creating fully immersive virtual reality experiences controlled entirely by the mind.

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Network Hardware: The Backbone of Modern Connectivity

Introduction

Network hardware is the physical equipment that connects computers and devices to create a communication system. It forms the foundation of every connected network and helps in sharing data quickly and securely. Important network hardware devices include routers, switches, firewalls, and access points. Routers connect different networks and direct data traffic efficiently. Switches connect multiple devices within the same network for smooth communication. Firewalls protect the network from cyber threats, while access points provide wireless internet connectivity.



In today's digital world, network hardware is essential for homes, schools, offices, and industries. It allows devices to communicate, share files, access the internet, and use shared resources such as printers and servers. Without proper network hardware, communication would become slow and unreliable.

Modern network hardware improves security by blocking unauthorized access and protecting sensitive information. Firewalls and advanced monitoring systems help prevent cyberattacks and ensure safe data transfer. Reliable hardware also reduces downtime and improves overall performance.

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AUTONOMOUS VEHICLES : THE FUTURE OF SELF-DRIVING TRANSPORTATION

Autonomous Vehicles, also known as self-driving cars, are one of the most advanced innovations in modern transportation technology. These vehicles are capable of sensing their surroundings, making decisions, and driving without direct human control. By combining Artificial Intelligence (AI), sensors, cameras, radar systems, and machine learning algorithms, autonomous vehicles can navigate roads, avoid obstacles, follow traffic rules, and ensure safe transportation.

Self-driving vehicles work through a combination of hardware and software systems. Sensors such as LiDAR, ultrasonic sensors, GPS, radar, and high-resolution cameras continuously collect real-time information about the environment. Artificial Intelligence processes this data and makes driving decisions like steering, braking, lane changing, and speed control.

The main objective of autonomous vehicle technology is to reduce human errors, prevent road accidents, improve fuel efficiency, and provide smarter transportation systems. Major companies like Tesla, Google Waymo, BMW, Mercedes-Benz, and Uber are investing heavily in autonomous driving research and development. Two key concepts in Autonomous Vehicle technology are:



Sensor Fusion : Combining data from multiple sensors such as cameras, radar, GPS, and LiDAR to create an accurate understanding of the vehicle's surroundings.

Artificial Intelligence and Machine Learning : AI algorithms analyze road conditions, traffic patterns, and obstacles in real time to make intelligent driving decisions automatically. Autonomous vehicles are classified into different levels of automation, ranging from driver assistance systems to fully self-driving vehicles without human intervention.

Applications:-

- **Self-Driving Cars :** Quantum Internet can create unbreakable encryption systems for banks, governments, and military organizations, protecting confidential information from hackers.
- **Accident Prevention :** AI-based driving systems can react faster than humans, helping reduce road accidents caused by human error, distraction, or drunk driving.
- **Fuel Efficiency:** AI systems optimize driving patterns, speed, and braking to reduce fuel consumption and energy waste.
- **Assistance for Disabled and Elderly People :** Self-driving cars can provide independent mobility solutions for people who are unable to drive manually.
- **Smart Traffic Management :** Connected autonomous vehicles can communicate with traffic systems to reduce congestion and improve traffic flow in smart cities

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Lights, Camera, Algorithm!

How a Diploma in Computer Engineering Unlocks Bollywood's Most Exciting Careers

The dream of Bollywood once belonged exclusively to actors, choreographers, and directors. Today, a quiet revolution is unfolding behind the cameras — and it is engineers who are leading it. India's Rs.19,000 crore Hindi film industry now depends on technology at every single stage: from pre-production planning software to AI-driven post-production pipelines, from real-time VFX rendering engines to streaming platform recommendation algorithms. For students who hold — or are pursuing — a Diploma in Computer Engineering, this transformation represents a once-in-a-generation opportunity. You already possess the technical toolkit. What you may not realise is just how many doors that toolkit can open inside Film City, Yash Raj Studios, and the offices of Prime Video or Netflix India.

“Bollywood's next superstar isn't going to be an actor. It's going to be a computer engineer who makes the impossible look real on screen.”

— Karan Johar, FICCI Frames 2025 Summit

The Opportunity Map: 5 Career Paths

1. VFX & 3D Technical Artist

Studios like Prime Focus, Red Chillies VFX, and Makuta FX hire diploma engineers as junior technical artists. Your knowledge of C++, Python, and GPU computing directly applies to Houdini, Nuke, and Maya pipelines. Starting salaries range from Rs. 3–6 LPA, scaling to Rs. 15+ LPA for senior pipeline developers within 5 years.

2. On-Set Data Manager (Digital Imaging Technician)

A Digital Imaging Technician (DIT) manages all data storage, backup, and colour accuracy on live film sets. Skills in RAID systems, LUTs, and colour-space management — all rooted in hardware and OS knowledge from your diploma — are essential. This is one of the most accessible film-set entry points for engineering diploma holders.

3. Audio-Visual Systems Engineer

Concert productions, award shows like Filmfare, and large-scale song-sequence shoots require AV engineers who understand signal processing, networking, and real-time rendering. Your diploma's electronics and networking modules are the precise foundation this role demands. Freelance rates can exceed Rs. 5,000–Rs.15,000 per day.

4. OTT Platform Developer

Netflix India, JioCinema, Hotstar, and Amazon Prime Video maintain massive engineering teams in Mumbai. Entry-level roles in backend development, CDN optimisation, and streaming quality algorithms are actively recruited at diploma level. These companies offer structured ESOP packages and global exposure that few other industries match.

Your Diploma Skills, Decoded for Entertainment

C / C++ / Python — Powers VFX rendering engines, game engines used for virtual production, and custom studio pipeline tools.

Networking & Operating Systems — Essential for OTT CDN work, on-set data management, live broadcast infrastructure, and studio IT operations.

Electronics & Hardware — Drone cinematography, LED volume walls, motion-capture hardware, and AV systems all need your foundation.

Step 1: Build a Specialisation Portfolio

Pick one lane — VFX scripting, mobile app development for OTT, or AI/ML. Create 2–3 solid GitHub projects or short demo reels specifically showcasing entertainment-relevant applications of your skills.

Step 2: Get Certified in Industry Tools

Autodesk certifications (Maya, 3ds Max), Foundry's Nuke certificates, or AWS Media Services certifications are respected by studios and require no bachelor's degree. Most can be self-studied in 3–6 months.

Step 3: Apply for Internships at VFX Studios

Red Chillies, Prime Focus World, and DNeg India run annual internship cohorts. A paid internship converts into a junior artist role 60% of the time. Mumbai and Hyderabad are the primary hubs.

Step 4: Network at Industry Events

FICCI Frames, WAVES (World Audio Visual Entertainment Summit), and NAB Show India are attended by studio tech heads who actively recruit diploma-level talent.

Computer engineering is no longer a supporting act in Bollywood — it is the new playbook of champions. The future of Indian entertainment belongs to those who master both creative vision and the power of technology. For diploma holders in computer engineering, the credits are rolling and your name is on them.

Author Name: KAPIL BHORIA



उद्यमिता दिवस पर नारा लेखन प्रतियोगिता आयोजित



हिसार। गुरु दक्ष गवर्नमेंट पॉलिटेक्निक, हिसार में उद्यमिता दिवस 2025 के अवसर पर नारा लेखन प्रतियोगिता का आयोजन किया गया। प्रतियोगिता का उद्देश्य विद्यार्थियों में उद्यमिता के प्रति जागरूकता एवं रचनात्मक सोच को बढ़ावा देना था।

प्रतियोगिता में विभिन्न शाखाओं के 29 विद्यार्थियों ने भाग लिया। मूल्यांकन के बाद कंप्यूटर इंजीनियरिंग प्रथम वर्ष की प्रचिता ने

प्रथम, इलेक्ट्रिकल इंजीनियरिंग पंचम सेमेस्टर के अमन ने द्वितीय तथा एफ.ए.ए. पंचम सेमेस्टर की काजल ने तृतीय स्थान प्राप्त किया।

PIET QUEST 2025 में गुरु दक्ष पॉलिटेक्निक के विद्यार्थियों की शानदार भागीदारी

हिसार। पाणिपत इंस्टीट्यूट ऑफ इंजीनियरिंग एंड टेक्नोलॉजी (PIET), पाणिपत द्वारा 28 अप्रैल 2025 को आयोजित PIET QUEST 2025 राज्य स्तरीय प्रतिभा खोज एवं क्विज प्रतियोगिता में गुरु दक्ष गवर्नमेंट पॉलिटेक्निक, हिसार के लगभग 100 विद्यार्थियों ने भाग लिया।

PIET QUEST विद्यालयों, पॉलिटेक्निक एवं महाविद्यालयों के विद्यार्थियों के लिए प्रतिवर्ष आयोजित की जाने वाली प्रतिष्ठित प्रतियोगिता है, जिसका उद्देश्य मेधावी विद्यार्थियों की पहचान कर उन्हें छात्रवृत्ति, पुरस्कार एवं शैक्षणिक सम्मान प्रदान करना है। प्रतियोगिता विभिन्न चरणों में आयोजित की जाती है।



संस्थान के विद्यार्थियों ने प्रतियोगिता में उत्साहपूर्वक भाग लेते हुए अपनी प्रतिभा और ज्ञान का उत्कृष्ट प्रदर्शन किया। विशेष उपलब्धि हासिल करते हुए कंप्यूटर इंजीनियरिंग के छठे सेमेस्टर के छात्र प्रिंस ने प्रतियोगिता के फाइनल राउंड तक पहुंचकर संस्थान का गौरव बढ़ाया।

DEPARTMENT EVENTS



विद्यार्थियों का वीवीडीएन टेक्नोलॉजीज में चयन

हिसार। गुरु दक्ष राजकीय बहुतकनीकी संस्थान के विद्यार्थियों ने एक बार फिर कैम्पस प्लेसमेंट में उत्कृष्ट प्रदर्शन करते हुए विभिन्न शाखाओं से बड़ी संख्या में चयन प्राप्त किया है। संस्थान में फरवरी-मार्च 2026 के दौरान आयोजित कैम्पस इंटरव्यू के माध्यम से वीवीडीएन टेक्नोलॉजीज प्राइवेट लिमिटेड सेक्टर-8, मानेसर में विद्यार्थियों का चयन किया गया। प्लेसमेंट ड्राइव में इलेक्ट्रॉनिक्स एंड कम्युनिकेशन इंजीनियरिंग (ईसीई) तथा कंप्यूटर इंजीनियरिंग शाखा के विद्यार्थियों ने भाग लिया। ईसीई शाखा से 2 विद्यार्थियों का चयन हुआ एवं कंप्यूटर इंजीनियरिंग शाखा से कुल 13 विद्यार्थियों का चयन किया गया। संस्थान में आयोजित इस कैम्पस इंटरव्यू का संचालन टीपीओ डॉ मुकेश बांसल के मार्गदर्शन में संपन्न हुआ। संस्थान के प्राचार्य जगमोहन सिंह ने चयनित विद्यार्थियों को बधाई दी है।

हिसार-आसपास

हिसार, बुधवार, 21 मार्च 2025 | 02

हरियाणा इंटर पॉलिटेक्निक एथलेटिक मीट में राजकीय बहुतकनीकी, हिसार ने जीती ओवरऑल स्पोर्ट्स ट्रॉफी

हिसार। गुरु दक्ष राजकीय बहुतकनीकी संस्थान के छात्रों ने हरियाणा इंटर पॉलिटेक्निक एथलेटिक मीट में राजकीय बहुतकनीकी, हिसार ने जीती ओवरऑल स्पोर्ट्स ट्रॉफी।

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गुरु दक्ष राजकीय पोलिटेक्निक हिसार में एन. सी. सी. की मनाई गई 78वीं रेजिंग डे वर्षगांठ



लैफ्टिनेंट सदीप कुमार तथा स्थायी अनुदेशक स्टाफ सूबेदार शमशेर सिंह द्वारा एन. सी. सी. ध्वज फहराकर किया गया, जिसके उपरांत समस्त कैडेटों ने एक स्वर में एन. सी. सी. गीत प्रस्तुत किया। ध्वजारोहण के बाद लैफ्टिनेंट सदीप कुमार और सूबेदार शमशेर सिंह ने कैडेटों को संबोधित करते हुए एन. सी. सी. के उद्देश्य, इसकी सामाजिक उपयोगिता तथा राष्ट्र निर्माण में इसकी महत्वपूर्ण भूमिका पर प्रकाश डाला। उन्होंने युवाओं में अनुशासन, नेतृत्व क्षमता, सेवा-भाव और देशभक्ति की भावना विकसित करने में एन. सी. सी. को एक सशक्त माध्यम बताया।

स्वच्छता जागरूकता रैली निकाली

- गुरु दक्ष राजकीय बहुतकनीकी के एनएसएस स्वयंसेवकों ने संस्थान व स्टाफ कॉलोनी में किया जागरूक

हरिभूमि न्यूज | हिसार

गुरु दक्ष राजकीय बहुतकनीकी में स्वच्छ हरियाणा मिशन के तहत स्वच्छता जागरूकता रैली आयोजित की गई। यह अभियान एनएसएस स्वयंसेवकों द्वारा व्याख्याता सोनू सिंह और लैफ्टिनेंट एनओ सदीप ओला के नेतृत्व में संपन्न हुआ। स्वयंसेवकों ने संस्थान परिसर और स्टाफ कॉलोनी क्षेत्र का दौरा कर छात्रों व निवासियों को नियमित स्वच्छता के महत्व के बारे में जागरूक किया।



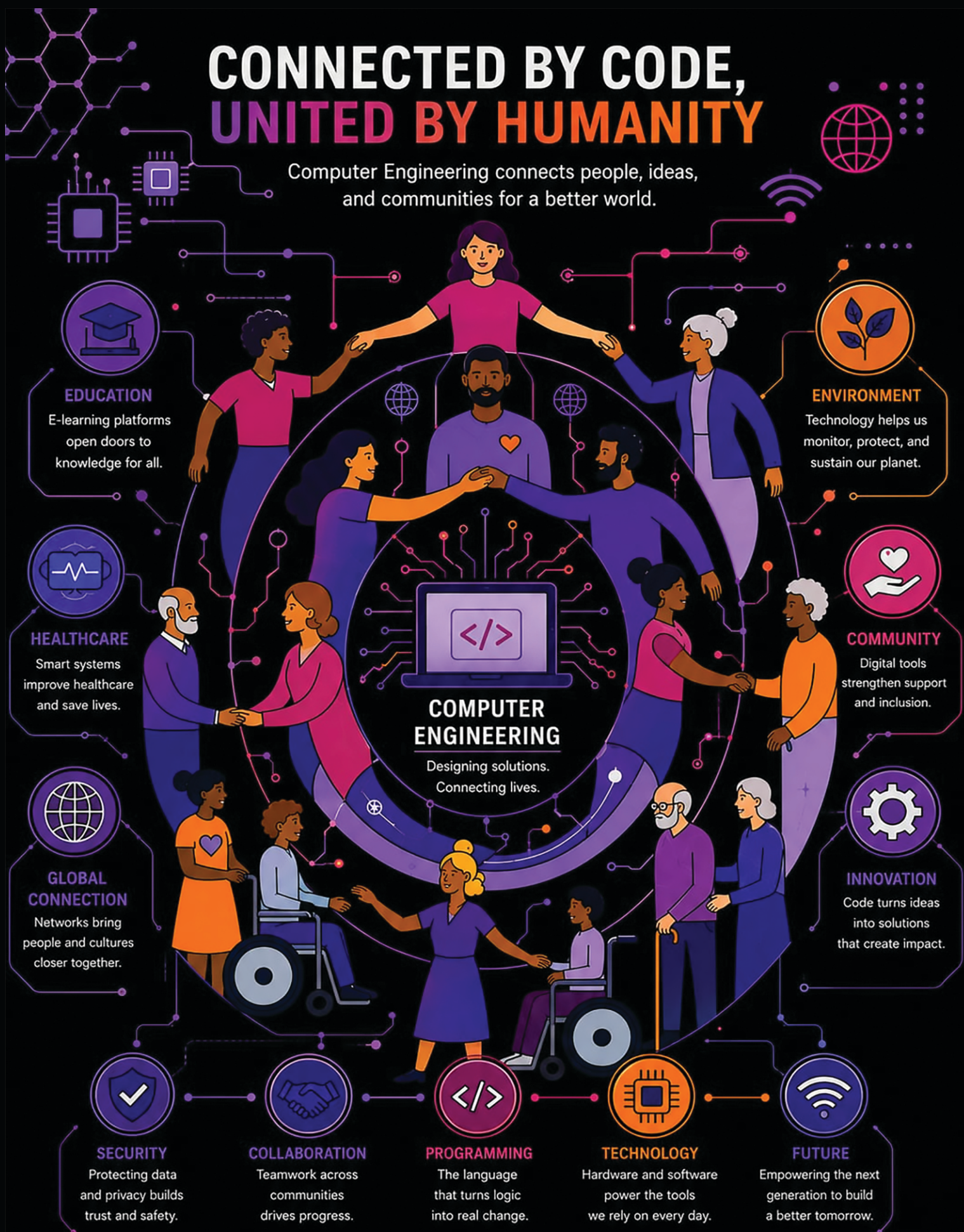
हिसार। स्वच्छता जागरूकता रैली निकालते स्वयंसेवक।

फोटो: हरिभूमि

उन्होंने लोगों को अपने आसपास के वातावरण को स्वच्छ और स्वस्थ बनाए रखने का संदेश दिया। इस अवसर पर प्राचार्य सुनील कुमार ने स्वयंसेवकों के प्रयासों की सराहना की।

CONNECTED BY CODE, UNITED BY HUMANITY

Computer Engineering connects people, ideas,
and communities for a better world.



ENGINEERING A BETTER TOMORROW, TOGETHER.

♥ EMPATHY | 🌐 EQUITY | 🤝 RESPECT | 👥 INCLUSION | 🌱 SUSTAINABILITY