2023

BYTE FLUENT

Departmental Magazine

Department of computer engineering
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 180 books and 5 e-journals. The department has well equipped seven computer labs having 180 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

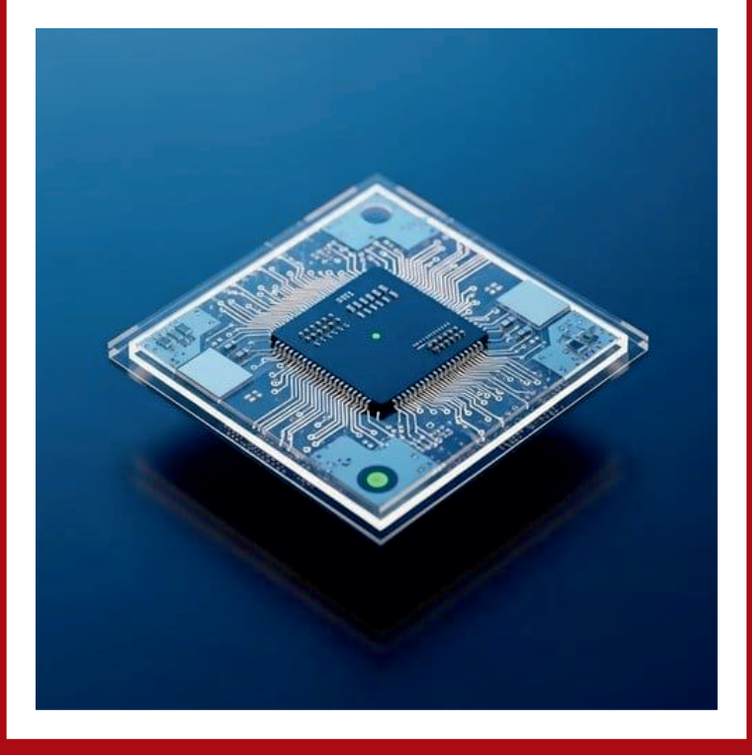
Faculty Members

1. Ms. Rajbala, Lecturer
2. Mr. Manish Nagar, Programmer

Students Members

1. Ashish Mishra - 210040800021
2. Chahat Verma - 210040800025

Editor's Note



BYTE FLUENT was never meant to be just ink on paper. It is proof — tangible, undeniable proof — that our department thinks, builds, and dreams out loud. Behind every headline lies a sleepless night; behind every illustration, a flicker of inspiration nobody wanted to lose.

Our deepest thanks to every student who contributed and every mentor who guided. This magazine is, quite simply, yours.

Gratefully,
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.

Mr. Rajeev Sardana
Head of Department
Computer Engineering

Technical Articles

Sr. No	Name of Article
1.	Embedded Machine Learning
2.	Brain Drain in India:
3.	The 19 Billion Dollar Mistake
4.	Code Without Cost
5.	Different AI, Different Skills
6.	The Silent Skill Drain
7.	Cyber Security
8.	Cloud Computing
9.	Quantum Computing
10.	The Art of Secrets
11.	Cyber security
12.	Bright Side of the Hoodie
13.	An artificial bee colony

Embedded Machine Learning: Methods and Applications for Edge Intelligence

Abstract / Brief Description of Paper:

Embedded Machine Learning, or TinyML, enables running machine learning models on resource-constrained microcontrollers with kilobytes of RAM and milliwatts of power. With 250 billion MCUs deployed globally, TinyML brings always-on AI to everyday devices without cloud dependency.



Unlike traditional IoT that streams data to the cloud, TinyML processes data locally, solving key challenges of bandwidth, latency, energy, privacy, and reliability. Inference occurs in <10ms while consuming <1mW, enabling battery operation for years.

Key challenges include severe resource limits, absence of OS, malloc, or FPU, and a fragmented hardware ecosystem across ARM, RISC-V, and Xtensa architectures.

Core optimization methods address these constraints:

1. Quantization converts 32-bit floats to int8, achieving $4\times$ size reduction and 2-4$\times$ speedup.
2. Pruning removes redundant connections to create sparse models.
3. Neural Architecture Search produces efficient models like MobileNet, MCUNet, and FOMO.
4. Knowledge Distillation transfers learning from large to tiny models.

TensorFlow Lite Micro is the industry-standard framework, running inference with ~ 130 operators using manual memory management and no dynamic allocation. Hardware vendors accelerate it via CMSIS-NN kernels.

Major applications include keyword spotting for wake-word detection, anomaly detection for predictive maintenance, and computer vision using TinyYOLO/FOMO on ESP32-CAM or Arduino boards.

Typical TinyML models require 50-500KB RAM, 200KB-2MB Flash, and achieve 10-100ms latency.

Future directions focus on on-device learning, Tiny LLMs, and test-time adaptation via TinyTTA. TinyML enables privacy-preserving, real-time intelligence at the edge, transforming billions of existing devices into smart sensors.

Aditya Singh
Roll No: 220040800005

Brain Drain in India: A Double-Edged Sword of Globalization

The Silent Exodus



Every year, thousands of India's brightest minds — engineers forged in IITs, doctors trained in AIIMS, researchers nurtured in premier institutions — pack their bags and board flights to Silicon Valley, London, Toronto, and beyond. This phenomenon, widely known as Brain Drain, represents the large-scale emigration of highly educated, professionally skilled, and intellectually gifted individuals from their native country to foreign nations offering superior economic opportunities, advanced research ecosystems, and enhanced standards of living.

In the Indian context, brain drain has emerged as one of the most significant socio-economic phenomena of the modern era — a mirror reflecting both the soaring aspirations of our talented workforce and the structural fault lines our nation must urgently address.

"India produces world-class talent. The question is not whether we can — it is whether we will give that talent a reason to stay."

The Cost We Cannot Ignore

India has long been recognized as an intellectual reservoir of extraordinary depth. Its universities and technical institutes produce world-class engineers, scientists, physicians, academicians, and entrepreneurs each academic cycle. However, a substantial proportion of this talent ultimately seeks professional fulfillment abroad — and with it, the nation quietly haemorrhages its most valuable asset.

Critics rightly argue that brain drain constitutes a silent transfer of national wealth. The Indian state invests enormously — through subsidized education, public research infrastructure, and scholarship programmes — to cultivate skilled professionals. When these individuals migrate, the return on that investment is harvested by foreign economies rather than the homeland. The public exchequer bears the cost; foreign corporations reap the reward.

The adverse consequences extend beyond economics. A persistent outflow of skilled professionals weakens domestic innovation pipelines, reduces research productivity, and creates critical shortages in sectors such as healthcare and higher education. Rural India, in particular, faces acute shortfalls in qualified doctors and engineers — positions that might otherwise have been filled by graduates who chose to serve abroad instead. Furthermore, the migration of exceptional minds widens the gap between India's developmental ambitions and its institutional capabilities.

Brain Circulation: A New Paradigm

Yet, the phenomenon cannot be viewed solely through a pessimistic lens. Contemporary economists and policy analysts have begun reframing brain drain as brain circulation — a more nuanced concept that acknowledges the dynamic, two-way flow of talent, capital, and knowledge between India and the global diaspora.

Indian professionals abroad contribute staggering sums through remittances — over USD 120 billion annually in recent estimates — making India consistently the world's top recipient of remittances. Beyond money, they foster international research collaborations, champion Indian enterprises on global platforms, and significantly enhance India's soft power and geopolitical prestige.

Consider the extraordinary list of Indian-origin leaders helming global giants: Sundar Pichai at Google, Satya Nadella at Microsoft, Shantanu Narayen at Adobe, and Indra Nooyi's legendary tenure at PepsiCo. These are not departures from India's story — they are chapters in it. Their success inspires millions of young Indians and routinely facilitates the transfer of knowledge, technology, and investment back to the homeland. The Bengaluru startup ecosystem, India's semiconductor push, and thriving IT corridors owe much to this diaspora connection.

"A nation's true strength lies not merely in retaining talent — but in creating conditions under which talent chooses to thrive."

Building the Ecosystem of Tomorrow

The challenge before India, therefore, is not to restrict mobility or erect bureaucratic barriers to emigration. That approach is both impractical and counterproductive in a globalized world. Rather, the imperative is to cultivate a domestic ecosystem characterized by innovation, meritocracy, research excellence, and entrepreneurial freedom — one that competes seriously with global destinations for talent.

This demands bold action on multiple fronts: substantially increasing public investment in R&D (India currently spends less than 0.7% of GDP on research, compared to over 3% in South Korea and the USA); reforming academic institutions to reward curiosity and risk-taking rather than rote compliance; creating vibrant startup ecosystems with patient capital and minimal regulatory friction; and ensuring that exceptional talent in healthcare, science, and education is compensated competitively within India.

Equally important is engaging the diaspora as strategic partners rather than viewing them as deserters. Dedicated programmers to attract reverse migration — such as NRI entrepreneur incentives, returning scientist schemes, and dual citizenship frameworks — can transform the brain drain narrative into a story of brain gain.

A Bridge, Not a Departure

In conclusion, brain drain is neither entirely a loss nor wholly a gain. It is a complex, multidimensional manifestation of globalization that resists simple moral judgments. It reflects human aspiration, institutional gaps, and global interconnectedness all at once.



Managed wisely — through intelligent policy, institutional reform, and genuine partnership with the diaspora — India's outward-moving talent can become not a symbol of departure, but a living bridge connecting national aspirations with global opportunities. The story of India's brain drain does not have to end in loss. With vision and will, it can become the first chapter of an even greater homecoming.

Manish Nagar

Designation: Programmer

The 19 Billion Dollar Mistake: A Lesson in Never Giving Up

Abstract / Brief Description of Paper:

My dear students, as we approach exam season, I see many of you worrying about your grades. I see the anxiety on your faces when you think about college applications or future interviews. You often feel that one failure, one low score, or one rejection letter defines your entire life.
Today, I want to tell you a story that I have shared with many batches of students before you. It is a story about a man who was told "No" by the biggest companies in the world, only to make them pay **19 Billion Dollars** for his idea just five years later.



The Billion-Dollar Duo: Brian Acton (left) and Jan Koum (right), the minds behind WhatsApp, proved that rejection is just a stepping stone to success.

The Day of the Rejection:
Let us travel back to the year **2009**. The world was changing fast. Smartphones were just starting to become popular. In the middle of this, a brilliant computer engineer named **Brian Acton** was looking for a job.
Brian was not a fresh graduate; he had experience. He applied to **Twitter**, which was a rising star in the tech world. They rejected him.He didn't lose hope. He then applied to **Facebook**, the giant of social media. He went through the interviews, answered their questions, and waited for the call.
The answer came back: **"No."**

Now, imagine if that happened to you. You would probably be devastated. You might think, "I am not good enough," or "My career is over." But Brian Acton did something different. He didn't cry. He didn't get angry. Instead, he went to Twitter (the same company that rejected him!) and posted a message that is now famous in history:
"Facebook turned me down. It was a great opportunity to connect with some fantastic people. Looking forward to life's next adventure."
He treated the rejection not as a failure, but as an **adventure**.

The Birth of a Simple Idea
Brian teamed up with his friend **Jan Koum**. Jan was an immigrant from Ukraine who had grown up very poor—so poor that he used to stand in line for food stamps. Together, they decided to stop looking for jobs and start building something of their own.
They noticed a problem. Sending SMS (text messages) was expensive, especially if you wanted to talk to family in other countries. They wanted to create an app that would let people chat for free using the internet.
They called it **WhatsApp**.



Their philosophy was simple:

- **No Ads:** They hated annoying advertisements.
- **No Gimmicks:** No games, no cartoons, just fast messaging.
- **Privacy:** They wanted people to feel safe talking to their loved ones.In the beginning, it was hard. They worked out of cheap cafes and sometimes didn't have enough money for proper equipment. But they kept coding. They kept fixing bugs. Slowly, people started to notice that WhatsApp was faster and cleaner than anything else.

The 19 Billion Dollar Phone Call

Fast forward to **February 2014**. Just five years had passed since Brian was rejected. WhatsApp had grown from a tiny idea into a global phenomenon with over **450 million users**. It was growing faster than Facebook itself!

Mark Zuckerberg, the CEO of Facebook, realized he had a problem. He couldn't beat WhatsApp, so he decided to buy it.

The price? **$19,000,000,000** (19 Billion Dollars).

To give you an idea of how much money that is: that is more than the annual budget of many small countries. It remains one of the largest technology acquisitions in history.The irony is beautiful. The same company that said Brian Acton was "not good enough" to work for them as an employee, had to pay him billions of dollars just 60 months later.

What Can We Learn From This?

As your teacher, I want you to write these three lessons in your heart, not just in your notebooks:

1. **Rejection is Redirection:** When you fail a test or lose a competition, it feels like a door has closed. But often, life is closing a small door so you can walk through a giant gate. If Brian had gotten that job at Facebook, WhatsApp would never exist.
2. **Attitude is Everything:** Notice Brian's tweet? He was polite and positive. He didn't burn bridges. Your attitude in your worst moments defines your future success.
3. **Start Small:** WhatsApp didn't start as a billion-dollar company. It started with two friends in a coffee shop. Do not be afraid to start small with your projects or your studies. Consistency creates greatness.

Paper Received By: Status: Accepted/Rejected/Revision Required

Ravi Sangwan

Designation: Lecturer

Code Without Cost: How Open Source Empowers Web Developers to Learn, Build, and Earn.

Abstract / Brief Description of Paper: In an era where education often comes with a hefty price tag, open source stands out as the great equalizer for aspiring web developers. It offers a complete learning ecosystem with zero financial investment and the potential for maximum career gain.

The Zero-Investment Toolkit: Every tool a modern web developer needs is available free of charge. The languages that power the web—HTML, CSS, JavaScript, Python, and PHP—are open source. The editors we write in, like VS Code, and the version control we rely on, Git, cost nothing. Want to build a dynamic site? Frameworks such as React, http://Vue.js, Django, and Laravel are free to download, modify, and deploy. Even databases like PostgreSQL and MySQL are open source.

Hosting is no longer a barrier either: Services like GitHub Pages, Netlify, and Vercel allow developers to launch professional portfolios and live projects without spending a rupee. For the cost of an internet connection, anyone can access the same stack used by Fortune 500 companies.

The Classroom Without Walls: Open source is more than free software; it is free education. Platforms like GitHub host millions of public repositories. A beginner can read the actual code behind WordPress, Bootstrap, or VS Code and see how professionals structure large applications. Curated learning paths from freeCodeCamp and The Odin Project guide students from first HTML tag to full-stack deployment, all at no cost.

Maximum Gain: From Learner to Professional: The real advantage appears when learning turns into earning. Contributing to open source projects creates a public, verifiable record of your skills. A GitHub profile with meaningful commits often speaks louder than a degree. Recruiters actively scout contributors to major projects, and many developers land jobs through pull requests rather than resumes.Beyond jobs, open source builds community. Developers debug together, review code together, and grow together. You stay current because open source is where new web technologies—like http://Next.js, Astro, and Tailwind CSS—are born and refined.

How to Getting Started Today

1. Set up your bench: Install Git, create a GitHub account, and pick a code editor.
2. Choose your track: Front-end with React, back-end with http://Node.js or Django, or full-stack.
3. Contribute small: Search for "good first issue" labels on GitHub and fix documentation or minor bugs.
4. Ship projects: Build, deploy, and share. Each project is a line on your resume.

For web developers, it means the only real investment required is time and curiosity. The returns are tangible: real-world skills, a global network, a standout portfolio, and a career path that begins the moment you write your first line of code.

In the world of web development, the source is open, and so is the opportunity.

Signature of Author:

Sunil Kumar

Designation / Roll No: 220040800129

Different AI, Different Skills: Pick the Right Tool for the Job



Abstract / Brief Description of Paper:

Saying “I use AI” in 2026 is like saying “I use transport.” Car, bike, train, or plane? Each gets you somewhere different. AI works the same way. Not all AIs are built equal, and using the right one for the right skill saves hours and makes you look like a pro.

Meet the AI Skill Squad

The Writer: ChatGPT, Claude, Gemini

Skill: Language, logic, explanations.Use them when you need essays, code logic, study notes, emails, or to debug concepts. They're your 24/7 tutor and writing partner. Ask Claude to summarize a 50-page PDF. Ask Gemini to explain a DBMS topic in Hinglish. These AIs think in words.

The Artist: Midjourney, DALL·E, Ideogram Skill:

Image generation, design, visual ideas.Need a poster for your college fest, a UI mockup for your project, or icons for an app? Describe it, get 4 options in 30 seconds. Diploma students use them for presentation graphics and portfolio polish. They don't replace designers, but they kill “blank canvas” fear.

The Coder: GitHub Copilot, Cursor, Codeium Skill:

Writing, completing, and fixing code.These AIs live inside your coding editor. They autocomplete functions, explain errors, and convert comments to code. For computer engineering diploma students, Copilot is like a senior sitting next to you during lab. But remember: it suggests, you decide.

The Speaker: ElevenLabs, Murf, Meta AI Voice Skill:

Voice, audio, presentations.Turn your project report into a podcast. Create voiceovers for YouTube videos without a mic. Practice English speaking with AI feedback. Perfect for students who fear stage fright but want to create content.

The Analyst: Chat GPT Code Interpreter, Perplexity, Julius AI Skill: Data, math, research. Upload an Excel sheet and ask “show me sales trends” or “find errors in this dataset.” These AIs run Python, plot graphs, and cite sources. Great for final-year projects involving data, surveys, or IoT sensor logs.

The Video Editor: Runway, Pika, CapCut AI Skill: Video creation and editing.Remove backgrounds, auto-cut silences, generate B-roll from text. A diploma student can now make a professional project video in one evening instead of one week.

The Real Skill: Knowing Which AI to Use

The highest-paying skill today isn't coding or design. It's tool selection. Using Midjourney to write code is like using a spoon to cut paper. Using ChatGPT to edit video is just as bad. Smart students build an “AI stack.” Writer for notes, Coder for labs, Artist for presentations, Analyst for projects. You don't need to master all AIs. You need to master matching the AI to the task.

AI won't take your job. But someone who uses different AIs for different skills will. In your diploma, in freelancing, in placements, the edge goes to the student who knows which button to press.

Author Name: Irfan
Roll No: 220040800045

The Silent Skill Drain: How AI Is Making Diploma Engineers Rusty

Every computer engineering diploma student today has a superpower in their pocket. Type a prompt, get full code, ready-made project reports, even viva answers. It feels like progress. But walk into a real lab interview and ask a student to reverse a string without AI. Many freeze. The superpower is quietly becoming a crutch.

Where AI Is Eroding Core Skills

Logic Building Gets Replaced by Prompt Building: The heart of a diploma is learning how to think. Flowcharts, algorithms, dry runs on paper. AI skips that. You describe the problem and get code. Over three years, students get great at asking AI questions, but weak at breaking problems into steps themselves. In an interview or on the job, there's no prompt box.

Debugging Muscle Weakens: Real skill is built when your code throws 15 errors and you fix them one by one. You learn compilers, syntax, and logic holes. With AI, students paste the error, copy the fix, and move on. They never develop the patience or instinct to trace bugs. On a live server at 11 PM, that instinct is everything.

Foundations Turn Fuzzy: Memory management, data structures, OS concepts, networking basics. These aren't glamorous, but they're why companies hire diploma engineers for core roles. AI gives you answers without context. So students can submit a linked list program, but can't explain pointers in a viva. Skills without understanding don't last.

Project Work Becomes Assembly Work:

Earlier, final-year projects meant soldering, wiring, and sweating over code. Now it's "download dataset, prompt AI, zip file, submit." Students can showcase 5 projects but can't change one line if the examiner asks. Recruiters have caught on. They now ask candidates to code live, no AI allowed.

Rethink Before It's Too Late

If AI replaces practice, diploma holders lose their biggest edge: hands-on skill.

- How to Stop the Skill Bleed: AI isn't evil. Misuse is. Treat it like a calculator after you learn math.
- Code First, AI Second: Write your logic yourself. Use AI only to optimize or review.
- Close the Laptop for Vivas: Explain concepts on a whiteboard. If you can't teach it, you don't know it.
- Break the Code: Take AI's program and deliberately add bugs. Fix them without asking for help.
- Do One "No-AI" Project: No Copilot, no Chat GPT. Just docs, textbooks, and your brain. That's your real portfolio piece.

AI won't kill your diploma. But it will kill the skills that make your diploma valuable if you let it. Companies don't hire prompters. They hire problem solvers. Your future paycheck depends on what you can do when the Wi-Fi is off. Build that version of yourself.

Author Name: Manisha
Roll No: 220040800066

Cyber Security: Protecting the Digital World



Cyber Security is one of the most important technologies in the modern digital era. It is the practice of protecting computers, networks, software, and data from cyber attacks, hacking, and unauthorized access. As the use of the internet and digital technology is increasing rapidly, cyber crimes are also growing day by day. Cyber Security helps individuals, businesses, and governments keep their important information safe and secure from online threats.

Cyber Security includes different methods such as encryption, firewalls, antivirus software, and ethical hacking to protect digital systems. It plays a major role in securing online banking, social media accounts, mobile applications, cloud storage, and business networks. Companies like Google, Microsoft, and Cisco invest heavily in Cyber Security to protect user data and maintain privacy.

Cyber Security is widely used in banking, healthcare, education, defense, and e-commerce sectors. It helps prevent data theft, online fraud, identity theft, and cyber attacks. Ethical hackers and cyber security experts work to find weaknesses in systems and improve security before hackers can exploit them. With the growth of artificial intelligence and cloud computing, Cyber Security is becoming even more important in today's world.

Cyber Security also creates many career opportunities such as ethical hacker, security analyst, network security engineer, and cyber security consultant. In the future, the demand for cyber security professionals will continue to increase because digital technology is becoming a part of everyday life. Cyber Security is not only protecting information but also helping create a safer and more secure digital future.

Advantages of Cyber Security:

- Protects important data and personal information.
- Prevents hacking, cyber attacks, and online fraud.
- Keeps online banking and digital payments secure.
- Protects business networks and confidential data.
- Helps maintain privacy and safe internet usage.
- Reduces the risk of data theft and malware attacks.
- Creates career opportunities in the IT and security field.
- Improves trust in online services and digital systems.

Author Name:Nitasha

Roll Number:230040800079

Cloud Computing: The Future of Digital Technology



Cloud Computing is one of the most revolutionary and rapidly developing technologies in the modern era. It is a technology that allows users to store, manage, and access data, applications, and computing services through the internet instead of relying on personal computers or local storage devices. In today's world, where digital technology is becoming an essential part of daily life, Cloud Computing plays a major role in improving communication, business operations, education, entertainment, and online services. It provides fast, secure, and flexible access to information from anywhere in the world with the help of an internet connection.

Traditional computer systems require physical hardware, storage devices, and expensive maintenance to manage data and software. Cloud Computing removes these limitations by providing online platforms where users can save files, run applications, and process data without depending on local machines. Popular cloud service providers such as Google Cloud, Microsoft Azure, and Amazon Web Services (AWS) offer powerful cloud solutions to millions of users and businesses worldwide.

Cloud Computing is widely used in many sectors such as healthcare, education, banking, entertainment, business, and government services. In education, students and teachers use cloud platforms for online classes, assignments, and digital learning materials. In healthcare, hospitals use cloud storage to maintain patient records and improve medical research. Banks and financial organizations use cloud systems for secure transactions and online banking services. Entertainment platforms like streaming services also depend on cloud technology to deliver videos, music, and online content quickly and smoothly to users across the world.

One of the most important features of Cloud Computing is flexibility and scalability. Organizations can easily increase or decrease storage and computing power according to their needs without purchasing expensive hardware. Cloud technology also provides automatic data backup, disaster recovery, and advanced security systems that help protect important information from data loss and cyber threats. Employees can work remotely, share files instantly, and collaborate on projects in real time, which improves productivity and communication.

Cloud Computing also supports modern technologies such as artificial intelligence, machine learning, big data analytics, and the Internet of Things (IoT). These technologies require large computing power and massive data storage, which cloud platforms can provide efficiently. As the use of smartphones, smart devices, and online applications continues to grow, the importance of Cloud Computing is increasing rapidly in every field of technology.

In the future, Cloud Computing is expected to become even more advanced and essential for digital transformation around the world. It is creating new career opportunities such as cloud engineer, cloud architect, system administrator, and cybersecurity specialist. Students and professionals should learn about Cloud Computing because it is becoming the foundation of modern information technology and innovation. Cloud Computing is not only changing the way people use technology but also helping create a smarter, faster, and more connected digital future.

Author Name: Pulkit

Roll No: 220040800092

Quantum Computing: Beyond the Hype and Toward a New Scientific Era

As a technology educator, I am often asked which emerging technology is most likely to transform our future. Over the years, my answer has changed—from the internet to cloud computing, from artificial intelligence to the Internet of Things. Today, however, I find myself increasingly drawn to a technology that remains largely unfamiliar to the public but possesses extraordinary transformative potential: quantum computing.

For many people, quantum computing appears to be a distant scientific concept, confined to research laboratories and academic journals. This perception is understandable. The principles that govern quantum systems often challenge our everyday understanding of reality. Yet history reminds us that many technologies that now define modern life—from electricity to the internet—were once considered abstract scientific curiosities. The limitations of classical computing are becoming increasingly apparent. As researchers, engineers, and policymakers confront challenges such as climate change, drug discovery, cybersecurity, and complex optimization problems, the computational resources required continue to grow exponentially. Traditional computers, despite their remarkable capabilities, are approaching practical limits in solving certain categories of problems.

Quantum computing offers a fundamentally different paradigm. Rather than relying solely on binary bits that exist as either 0 or 1, quantum computers utilize qubits that can occupy multiple states simultaneously through the phenomenon of superposition. Combined with quantum entanglement, this enables a level of computational parallelism that has no direct equivalent in classical systems.

The significance of this capability extends far beyond faster calculations. Consider pharmaceutical research. Developing a new drug can require years of experimentation and billions of dollars in investment. Quantum computers may eventually allow scientists to simulate molecular interactions with unprecedented precision, accelerating the discovery of treatments for diseases that continue to challenge humanity.

Perhaps what fascinates me most is the intersection of quantum computing and artificial intelligence. As AI systems become increasingly sophisticated, their demand for computational power continues to rise. Quantum technologies may one day provide the foundation for solving optimization problems that currently constrain machine learning models, opening entirely new avenues for innovation.

The history of technological progress teaches us that genuine revolutions often begin quietly. Quantum computing may still be in its formative years, but its potential impact on science, medicine, cyber security, and innovation is too significant to ignore. The question is no longer whether quantum technologies will influence our future. The more important question is how prepared we are to harness their potential responsibly and effectively.

Author Name: Naveen Arora

Designation: Sr. Lecturer

The Art of Secrets: Why Learning Encryption Is the Heart of Cyber Security



In a world where data is currency, encryption is the lock on the vault. From your WhatsApp chats to UPI transactions, encryption quietly protects billions of digital interactions every day. For anyone stepping into cybersecurity, understanding encryption is not optional—it is foundational.

What Is Encryption, Really?

Encryption is the process of converting readable data (plaintext) into scrambled code (ciphertext) that can only be accessed by authorized parties. If cybersecurity is the bodyguard, encryption is the bulletproof vest. It ensures confidentiality, integrity, and trust across the internet.

Two main types of encryption drive the field:

- **Symmetric Encryption:** Uses a single key for both encryption and decryption.
- **Asymmetric Encryption:** Uses a pair of keys—a public key and a private key. Digital signature systems, such as those used in Aadhaar-enabled services, rely on this approach.

Why Learn Encryption?

1. It's Everywhere

Encryption powers HTTPS websites, VPNs, password storage systems, digital signatures, blockchain technologies, and even your smartphone's fingerprint lock.

2. It Builds Better Defenders

Understanding algorithms such as AES, RSA, and SHA helps cybersecurity professionals identify weak implementations and design more secure systems.

3. It Provides a Career Edge

Roles such as Security Analyst, Cryptographer, Penetration Tester, and Cybersecurity Consultant require a strong understanding of encryption concepts. Even web developers need knowledge of hashing and TLS to build secure applications.

4. It Is a Future-Proof Skill

With quantum computing advancing rapidly, post-quantum cryptography is emerging as one of the most important areas of cybersecurity research and development.

How to Start Learning Encryption

1. Grasp the Basics

Learn key concepts such as plaintext, ciphertext, encryption keys, hashing, digital signatures, and certificates. Free resources such as Khan Academy and Stanford University's online cryptography courses provide excellent introductions.

2. Practice with Tools

Experiment with tools such as OpenSSL, GPG, or Python's Cryptography library to encrypt files and messages in a safe learning environment. Never test encryption techniques on systems you do not own or have permission to access.

3. Study Real-World Failures

Analyze incidents involving weak Wi-Fi encryption, outdated protocols, or poorly hashed passwords. These examples demonstrate that strong algorithms alone are not enough; proper implementation is equally important.

4. Stay Current

Follow standards and recommendations from organizations such as NIST and OWASP to stay informed about approved encryption methods and emerging security practices.

Author Name: Rajat Jangra

Roll No.: 220040800094

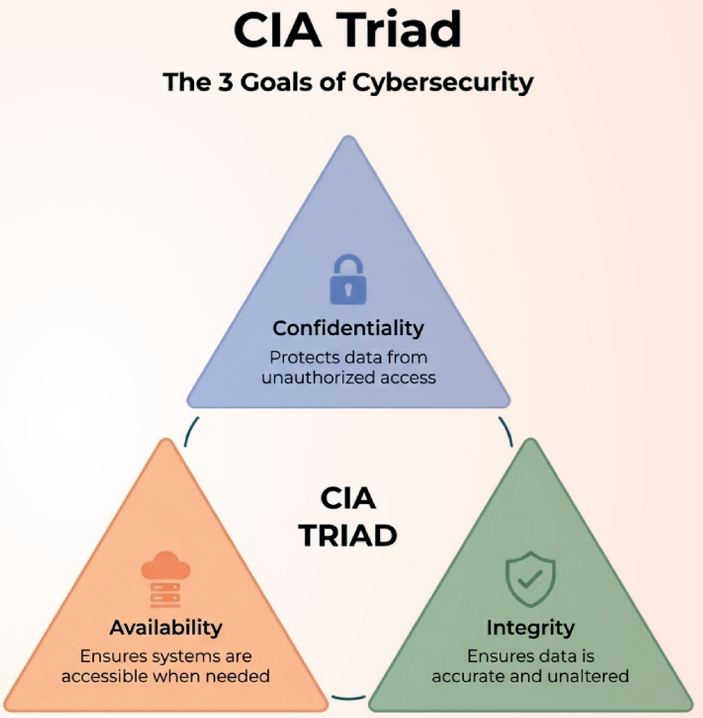
Cyber security
Shielding the Digital Architecture

Brief Description of Paper:

In our hyper-connected world, every piece of software we build and every network we configure is a potential target for malicious actors. Cybersecurity is no longer just an IT support task; it is a foundational pillar of modern computer engineering. Learning cybersecurity means shifting your mindset from simply building systems to actively defending them.

The ultimate goal of cybersecurity is anchored by three core principles known as the **CIA Triad**:

- **Confidentiality:** Ensuring that sensitive data is accessible only to authorized users (primarily achieved through strong encryption).
- **Integrity:** Guarding against unauthorized modification or deletion of data to ensure information remains accurate and trustworthy.
- **Availability:** Guaranteeing that authorized users have reliable, uninterrupted access to systems and data whenever they need it.



The focus of a computer engineer is increasing on **Application Security** (writing secure code that prevents vulnerabilities like SQL injections) and **Network Security** (configuring firewalls, intrusion detection systems, and secure protocols to protect data in transit). The global shortage of cybersecurity professionals means that practical skills in this field are highly valued. The foundational, industry-recognized certifications like CompTIA Security+ or Certified Ethical Hacker (CEH) may prove the booster dose for any computer professional. If one enjoys solving puzzles, breaking down complex systems, and protecting digital infrastructure, specializing in cybersecurity offers a deeply rewarding, future-proof career path.

Author Name: Ravita

Roll Number: 220040800095

Bright Side of the Hoodie: A Positive Approach in the Hacking World



When most people hear "hacker," they picture a shadowy figure breaking into systems. But the hacking world has a positive side that rarely makes headlines. Ethical hacking, also called "white-hat hacking," is about using the same skills for protection, not harm.

What is Positive Hacking?

Positive hacking means finding weaknesses in websites, apps, and networks before criminals do. Ethical hackers are the digital immune system of the internet. Companies like Google, Microsoft, and Meta run "bug bounty" programs that pay security researchers to report flaws responsibly. A college student in India can earn more from one valid bug report than from a summer internship, with zero investment beyond a laptop and internet.

Why It Matters

Every data breach you read about could have been prevented by an ethical hacker. Hospitals, banks, power grids, and even your UPI app depend on these professionals to stay safe. Governments now recruit ethical hackers to defend national infrastructure. The approach is simple: think like an attacker to build stronger defenses.

How to Join the Positive Side

1. Learn the basics legally: Study networking, Linux, and web technologies through free platforms like Try Hack Me, Hack The Box Academy, and OWASP.
2. Get certified: Certifications like CEH, CompTIA Security+, and OSCP prove your skills to employers.
3. Practice on labs, not real sites: Use intentionally vulnerable machines and CTF competitions. Never test on systems you don't own or lack written permission for.
4. Follow responsible disclosure: If you find a bug, report it to the owner privately and give them time to fix it before going public.

The Impact

Ethical hackers have helped patch critical flaws in medical devices, voting machines, and financial apps. They protect user privacy, prevent fraud, and make the digital world safer for everyone. Many go on to become security engineers, consultants, and startup founders.

The Bottom Line

Hacking is a tool. Like a knife, it can harm or heal depending on the hand that wields it. The positive approach in the hacking world chooses to defend, educate, and improve. For students and developers, it's a career path that combines curiosity, problem-solving, and genuine social impact.

Author Name: Ritu

Roll No: 22040800099

An artificial bee colony algorithm for data clustering

Abstract: *Artificial Bee Colony (ABC) algorithm is a popular optimization method inspired by intelligent foraging behavior of honey bees. However, there are shortcomings with ABC in terms of poor exploitation of solutions as well as slow convergence. In order to improve the algorithm performance, a number of algorithms have been proposed by incorporating the chaotic sequences in combination with opposition based learning in the initialization phase. Moreover, sigma truncation scheme is used to select good fitness solutions. Finally, the exploitation of search solutions in onlooker bee phase is also improved using various techniques.*

Introduction:

ABC is a population based optimization algorithm which is iterative in nature. Basically, ABC consists of five phases: initialization phase, employed bee phase, probabilistic selection phase, onlooker bee phase and scout bee phase. Bees going to a food source already visited by them are employed bees while the bees looking for a food source are unemployed. The onlooker bees wait for the information from employed bees for food sources and scout bees carry out search for new food sources. The information exchange among bees takes place through waggle dance. There is one employed bee for every food source. In this way, exploitation process is performed by employed and onlooker bees, whereas scouts perform exploration of search space.

There are three control parameters used in ABC algorithm: number of employed or onlooker bees to represent the number of food sources (SN), the value of limit, maximum cycle number (MCN). The main steps of ABC are as under:

1. Generate the initial population of solutions using Equation 1 and evaluate the fitness using Equation 2.
2. Generate new solutions for employed bees using Equation 3 and evaluate the fitness.
3. Apply the greedy selection process for the employed bees.
4. Calculate the probability values for the current solution using Equation 4 so that onlooker bee may choose one according to its value.
5. Assign onlooker bees to the solutions according to probability, generate new solutions using Equation 3 and evaluate the fitness.
6. Apply the greedy selection process for onlooker bees.
7. If there is a solution abandoned by bees, stop its exploitation and replace it with a new solution produced by Equation 1.
8. Memorize the best solution found so far.
9. Check the termination criteria. If not satisfied, go to step 2, otherwise stop.



$$x_{ij} = x_{minj} + rand(0,1)(x_{maxj} - x_{minj}) \quad (1)$$

where $i \in \{1,2,\dots,SN\}$ and $j \in \{1,2,\dots,D\}$. SN is the number of food sources, D is dimension of the problem, x_{ij} is the parameter for i^{th} food source in j^{th} dimension, x_{maxj} and x_{minj} are the upper and lower bounds for x_i.

$$fit_i = \begin{cases} \dfrac{1}{1+f_i}, & f_i \geq 0 \\ 1+abs(f_i), & f_i < 0 \end{cases} \quad (2)$$

where f_i is the specific objection function and fit_i is the fitness value.

$$v_{ij} = x_{ij} + \emptyset_{ij}(x_{ij} - x_{kj}) \quad (3)$$

where k $\in \{1,2,\dots,SN\}$ and $i \neq k$. $\emptyset_{ij}$ is a random number in the range [-1,1] to control the production of neighbor solutions around x_{ij}, v_{ij} is the new solution for x_{ij}.

$$p_i = \frac{fit_i}{\sum_{j=1}^{N} fit_j} \quad (4)$$

where fit_i is the fitness value of i^{th} solution and p_i is the selection probability of i^{th} solution.

Author Name: Dr. Ajit Kumar
Contact Number: 9416133810

DEPARTMENT EVENTS





सुर्खियाँ

गुरु दक्ष बहुतकनीकी में वर्कशॉप

हरिभूमि न्यूज ⏭ हिसार

गुरु दक्ष राजकीय बहुतकनीकी संस्थान में एक वेब डवलेपमेंट पर वर्कशाप का आयोजन मैगा टैनो बोट प्राइवेट लिमिटेड ने किया। इस अवसर पर रश्मि तथा आरजू ने कम्प्यूटर फाइनल इयर के विद्यार्थियों को वेब डवलेपमेंट पर एक वर्कशाप के माध्यम से छात्रों को विस्तारपूर्वक जानकारी प्रदान की। विशेषज्ञों ने विद्यार्थियों को यह भी बताया कि कैसे वे फोन अथवा अन्य ऑनलाइन माध्यमों से घर बैठे भी वेब डवलेपमेंट पर जानकारी प्राप्त कर सकते हैं, और किस प्रकार कई समस्याओं का समाधान ऑनलाइन प्रक्रिया से कर सकते हैं। कार्यक्रम का सफल आयोजन संस्थान के प्राचार्य पारितोष पराशर के मार्गदर्शन एवं मैगा टैनो बोट प्राइवेट लिमिटेड की टीम के सहयोग से किया गया।



हिसार । कार्यक्रम में उपस्थित कंपनी के प्रतिनिधि एवं अन्य।

ये रहे उपस्थित

समापन सत्र में विभागाध्यक्ष डॉ. मुकेश बंसल ने टीम के चेयरमैन सुरेश कुमार एवं वक्ताओं का आभार व्यक्त किया। इस अवसर पर संस्थान के रवि सांगवान तथा सुनील सोनी उपस्थित रहे।

पालीटेक्निक ने जारी किया तकनीकी न्यूजलेटर



अभियांत्रिकी का तीसरा संस्करण जारी करते संस्थान प्राचार्य अशोक कुमार। पीआरओ

हिसार : राजकीय बहुतकनीकी संस्थान (पालिटेक्निक) के प्राचार्य अशोक कुमार और तकनीकी न्यूजलेटर की टीम ने सोमवार को अभियांत्रिकी का तीसरा संस्करण जारी किया। इस दौरान संस्थान के अन्य स्टाफ मौजूद रहा। मुख्य संपादक राजेश कादियान ने बताया कि तकनीकी न्यूजलेटर बच्चों को प्रोत्साहन करता है। इस न्यूजलेटर के जरिए कालेज के विभिन्न कार्यों को छात्रों के सामने रखने से उनका सर्वांगीण विकास होता है। जैसे पेंटिंग प्रतियोगिता में भाग लेना, प्रोजेक्ट बनाना आदि। न्यूजलेटर के इस संस्करण के प्रकाशित के समय तरुण कुमार, जगदीश चन्द्र व अजय नेहरा मौजूद रहे। न्यूजलेटर अभियांत्रिकी के जगदीश चंद्र ने बताया कि इस न्यूजलेटर की कापियां 1280 बच्चों व लगभग 210 कालेज स्टाफ में बांटी जाएगी। (जासं)

हिसार, सोमवार, 11 दिसंबर 2023 | 04

राजकीय पॉलिटेक्निक में तीसरी इंटर ब्रांच क्रिकेट प्रतियोगिता का हुआ आगाज

अफसर अली को मिला मैन ऑफ द मैच का खिताब



राजकीय पॉलिटेक्निक हिसार के प्रधानाचार्य अशोक कुमार टीम से परिचय लेते हुए।

सिटी पल्स न्यूज, हिसार। राजकीय पॉलिटेक्निक हिसार में आज तीसरा क्रिकेट टूर्नामेंट शुरू हुआ। प्रतियोगिता की शुरुआत प्रधानाचार्य अशोक कुमार ने पहली गेंद पर चौका मारकर की। पहला मैच इलेक्ट्रॉनिक्स और इलेक्ट्रिकल टीमों के बीच खेला गया जिसमें इलेक्ट्रिकल टीम ने पहले खेलते हुए 120 रन का लक्ष्य दिया, जिसे इलेक्ट्रॉनिक्स टीम के खिलाड़ियों ने आखिरी गेंद पर छक्का मारकर हासिल कर लिया। इलेक्ट्रॉनिक्स टीम के खिलाड़ी अफसर अली को 40 गेंदों पर 9 छक्के और 3 चौकों की मदद से 83 रन बनाने पर मैन ऑफ द मैच का पुरस्कार सुनील कुमार, संजय कुमार, अशोक चौधरी और आजाद हुडा ने दिया। इलेक्ट्रिकल टीम के कप्तान संदीप शर्मा और इलेक्ट्रॉनिक्स के कप्तान अजय नेहरा थे। आयोजन समिति में खेल प्रभारी अरविंद लौरा एवं संदीप ओला शामिल थे। मैच में रोहित मलिक और रमेश शर्मा अंपायर और कमेंट्रेटर डॉ. दिनेश नैन व डॉ. घनश्याम माहिया रहे।



DEPARTMENT OF COMPUTER ENGINEERING
GOVT. POLYTECHNIC, HISAR

