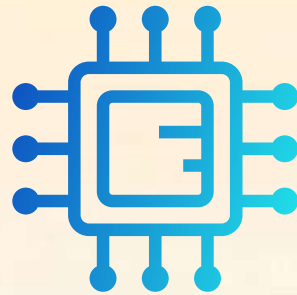




BBDNIIT

Babu Banarasi Das Northern India Institute of Technology



CAMPUS DRONE'26

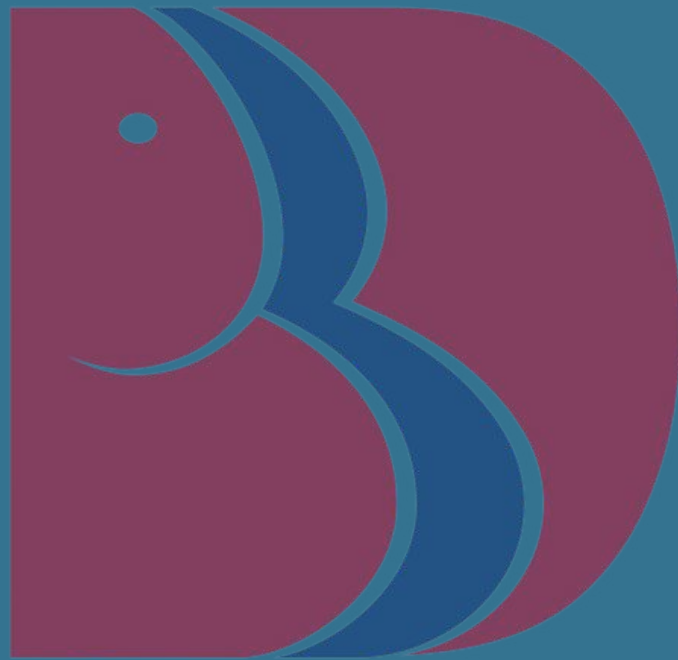
COMPUTER SCIENCE & ENGINEERING DEPARTMENT



Babu Banarasi Das Northern India Institute of Technology

Sector-II, Dr. Akhilesh Das Nagar, Ayodhya Road, Lucknow (U.P.) - 226028, India

Ph.: +91-(522)-6196222/6196223/6196336/Website: www.bbdniit.ac.in/Email: info@bbdniit.ac.in



BBDNIIT

NBA ACCREDITATION



we are proud to say that

Babu Banarasi Das Northern India Institute of Technology

is now Accredited by



for the Second Time
in Two Undergraduate Programs

Computer Science & Engineering Information Technology



What is it?

NBA accreditation is a quality assurance process that evaluates and certifies educational programs, ensuring they meet high standards. It enhances program credibility, student employability, and aligns with global education benchmarks. Accredited programs are recognized nationally and internationally, benefiting both students and institutions.

Lord Ganesha's Grace

वक्रतुण्ड महाकाय , सूर्यकोटि समप्रभ ।
निर्विघ्नं कुरु मे देव , सर्वकार्येषु सर्वदा ॥

The BBD Campus proudly houses a beautiful Ganesh temple, a spiritual haven that infuses the college with a profound sense of serenity and purpose. The temple's presence on campus is more than just a place of worship; it symbolizes a bridge between the academic and the divine, offering students a space to connect with their spirituality amid their educational journey.

Ganesh Ji, the revered remover of obstacles and the harbinger of wisdom and prosperity, holds a special place in Hindu tradition. His temple at BBD Campus stands as a testament to these values, providing students with a sanctuary where they can seek blessings, reflect, and find solace during their studies. The essence of the temple extends beyond its physical structure, permeating the entire campus with a spirit of peace and positivity.

For many students, college life is a time of immense growth, but it also comes with its share of challenges and uncertainties. The Ganesh temple offers a reassuring presence, reminding students that they are not alone in their journey. It encourages them to pause, pray, and draw strength from their faith, fostering a holistic approach to education that nurtures both the mind and the soul. The act of worshiping together also fosters a sense of community, as students from diverse backgrounds come together in shared reverence, strengthening their bonds and promoting a culture of mutual respect and support.

The choice of a Ganesh temple specifically holds deep significance. Lord Ganesh, revered as the deity of beginnings, is invoked at the start of new ventures to ensure success and remove obstacles. For students embarking on their academic journey, seeking Ganesh's blessings can be a source of immense comfort and confidence. His wisdom and benevolence inspire students to pursue their goals with determination and integrity, knowing they have divine support.

Moreover, the Ganesh Ji temple at BBD Campus serves as a reminder of the cultural and spiritual heritage that underpins our education system. It encourages students to value and preserve these traditions, recognizing that true education encompasses not just intellectual growth, but also moral and spiritual development.

Dr. Akhilesh Das Gupta Ji



LATE DR. AKHILESH DAS GUPTA
MBA, LLB, Ph.D.
Ex-Member of Parliament (Rajya Sabha)
Hon'ble Founder Chairman, BBD Group

"We not only make technocrats at BBD, we churn out citizens of the world, perfect in all respects, be it leadership, competence, confidence, communication, moral or knowledge..." - Akhilesh Das Gupta's Vision.

A distinguished political leader, philanthropist, educationist and social worker, Dr. Akhilesh Das is the pride of Lucknow city. He has established himself as a worthy son of his illustrious father Late Babu Banarasi Das Ji.

He has obtained MBA, LLB & Ph.D.(Human Resource Management)degrees, Dr. Akhilesh Das decided to follow his father's footprints by choosing Social Service as his primary goal. In his distinguished public life spanning well over three decades, Dr. Das was first elected as the Mayor of Lucknow in year 1993 and became one of the youngest Mayors of the world. Subsequently, he was elected as a Member of Parliament (Rajya Sabha) in November 1996 and was re-elected for a second term in November 2002 till November 2008. Dr. Das has been elected again as a Member of Parliament (Rajya Sabha) for a third consecutive term in 2008 till 2014.

Dr. Das has been a member of many important parliamentary committees and National level apex advisory & statutory bodies including the AIMS. He has been a member of the Executive Committee of AICTE. He had been the Chairman Parliamentary Standing Committee for Industries. He also served with distinction as the Union Minister of State for Steel and made a place for himself as one of the foremost National leaders.

Contribution To Sports

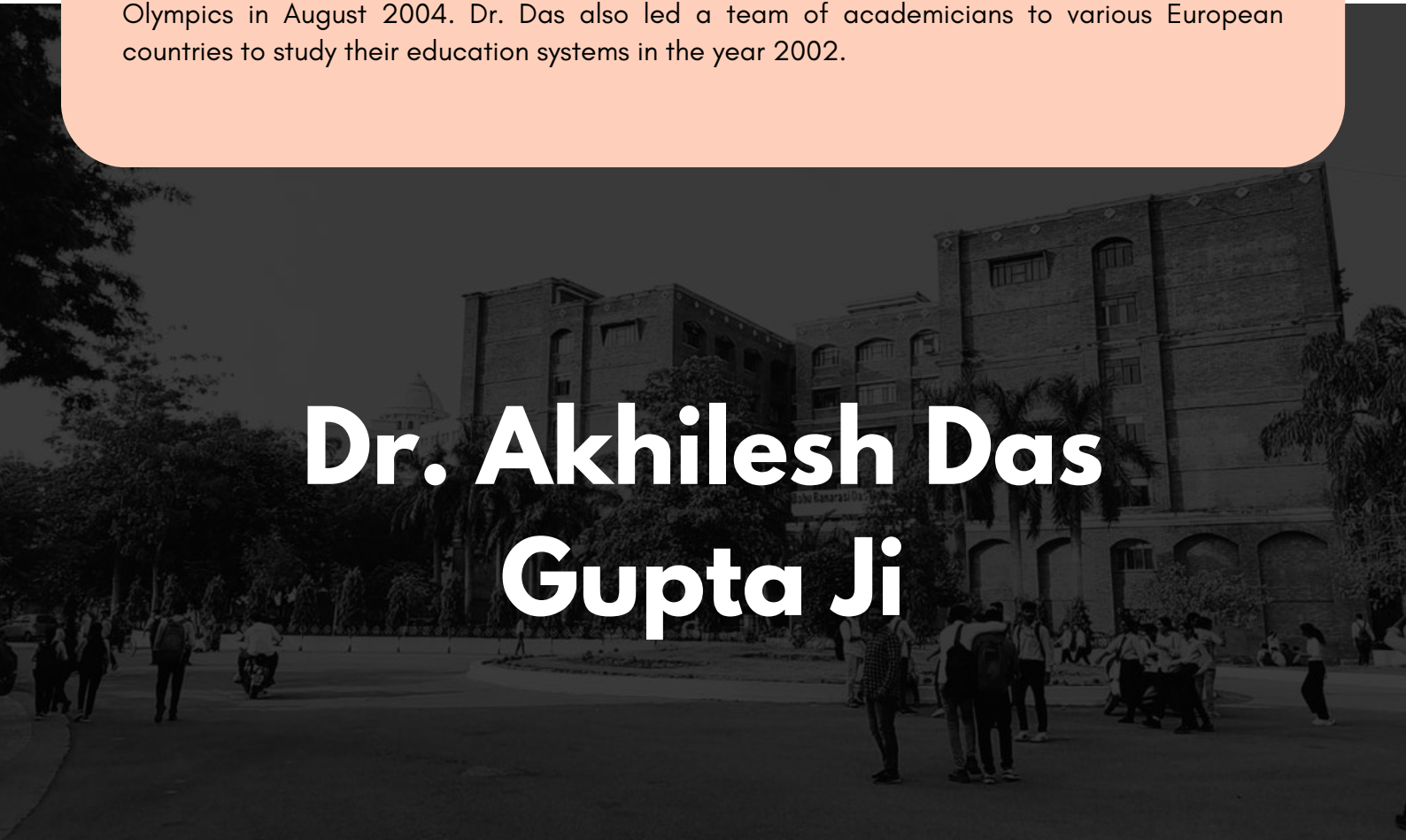
Dr. Akhilesh Das is an enthusiastic sports person. He underwent an exhaustive training in England as a Junior Badminton player. Later, he represented and captained the U.P. State Badminton team for many years and won many National & International tournaments including the National Doubles Championship. His love for other sports is no less. He has been instrumental in organizing and facilitating many National level tournaments in various sports. Presently he is the president of the U.P. Olympic Association & Chairman of Badminton Association of India.

Contribution To The Cause Of Education

As a social thinker, Dr. Das realized the need of Quality Technical & Professional education for the overall growth and upliftment of the masses and development of the State of Uttar Pradesh. Accordingly, Babu Banarasi Das Educational Society (BBDES) was founded through which the torch for higher professional education was lit in Lucknow, the Capital of U.P. The first institution in the series, Babu Banarasi Das National Institute of Technology & Management (BBDNITM) was established in 1998.

Travels And Experiences

He has travelled extensively to U.K., U.S.A., Japan, France, Switzerland, Spain, Portugal, Sau Paulo etc. on several occasions. Dr. Das has attended several World Seminars and Conferences including UNO sponsored Conference of Mayors (Japan) in 1993 and UNCTAD XI Conference (Brazil) in 2004. As the Mayor of Lucknow, he attended the International Children's Game held in Canada in 1994 and led the Indian Badminton Team as its Chef-de-Mission at the Athens Olympics in August 2004. Dr. Das also led a team of academicians to various European countries to study their education systems in the year 2002.



**Dr. Akhilesh Das
Gupta Ji**

Mrs. Alka Das Gupta Ji



MRS. ALKA DAS
M.B.A., L.L.B.
Chairperson, BBD Group

A lady with spirit, determination and zeal, Mrs. Alka Das has been the driving force behind her husband Dr. Akhilesh Das. She is the daughter of Late Justice D. P. Gupta, who held high positions in the State of Rajasthan, as its Governor and Chief Justice. She was brought up on Gandhian ideals and philanthropic traditions.

Mrs. Das is a Management expert and a legal luminary who has a long involvement with issues of social justice and women empowerment in our country. She is a legal consultant to several reputed organizations and an active Social Worker. She is connected with many National Social & Educational Organizations. She is also a Life Member of the "Rajasthan High Court Bar Association". The establishment of Northern India Engineering College, Lucknow was an initiative taken by her to provide quality professional education to match the International Standards.

She has travelled extensively to countries like Denmark, Italy, Japan, France, Switzerland, UK and USA to study the pattern of education and facilities provided to the students there. As a Co-founder of Babu Banarasi Das Group of Educational Institutions, Mrs. Das has made a fertile attempt to nurture a generation of self-made and highly motivated students with an inbuilt commitment to do something constructive for the Country

Mr. Viraj Sagar Das Ji



Mr. Viraj Sagar Das
B.A LL.B (Hons.),
Advocate
President, BBD Group

"Education is the most powerful weapon which you can use to change the world"
– Nelson Mandela

Babu Banarasi Das University has its roots lying deep in quality education practices that equip each student with broad outlooks to prepare them for this futuristic world. We are committed to providing the education that fulfils the needs of today's world. Today, education is not limited to textbook courses and their practical implementation. Education has been through a major transformation where apart from the syllabus, it has become imperative to inculcate some extra skills in the students so that they could truly succeed in their lives. We encourage our students to perform well in their academics and also to take active participation in all the co-curricular activities to develop interpersonal skills, take up challenges, be self-dependent and most importantly, have a good time while learning.

To quote Dr. A.P.J.Abdul Kalam, "Learning gives creativity, creativity leads to thinking, thinking provides knowledge, and knowledge makes you great".

Director's Message



Prof. (Dr.) V. K. Singh
Director (Engg.), BBDNIIT, Lucknow

Dear Readers,

"One child, one teacher, one book, one pen can change the world." – Malala Yousafzai

It gives me immense pleasure to introduce our Computer Science and Engineering Departmental college magazine at Babu Banarasi Das Northern India Institute of Technology (BBDNIIT), Lucknow. Since its inception, BBDNIIT has been committed to providing quality technical education and developing competent technocrats who are socially sensitive and committed to excellence on a global scale.

For over 17 years, BBDNIIT has stood as a beacon of academic excellence and innovation in the field of engineering. Our esteemed faculty, state-of-the-art infrastructure, and rigorous academic processes are all geared towards nurturing talent and fostering an environment of growth and learning.

In this magazine, you will find a vibrant showcase of the creativity, dedication, and hard work of our students and faculty. It reflects the dynamic and inclusive community we have cultivated, where every student is encouraged to pursue their passions and excel both academically and personally. Our systematic teaching-learning process prepares students for the challenges ahead, equipping them with the knowledge, skills, and ethical values necessary to make significant contributions to society.

The global technology landscape is evolving rapidly, and to remain competitive, our students must be prepared to face new challenges head-on. BBDNIIT is dedicated to training students to meet these challenges with confidence and competence. We continue to strive for excellence in professional education, aiming for new heights and fostering a thinking, professional order.

I encourage all students to make the most of their time with our dedicated faculty and staff, to develop their proficiency, and to grow both personally and professionally. The doors of our faculty members are always open for guidance and support.

With best wishes for your continued success and growth.

HOD's Message



Prof.(Dr.) Anurag Shrivastava
Head of department

Dear Readers,

"The roots of education are bitter, but the fruit is sweet." —Aristotle

It is a matter of pleasure to speak with all of you through this magazine. We all can take pride from the fact that each one of us has contributed to the present day glory and growth of our college.

I am happy to note that various initiatives are taken by the faculty to disseminate knowledge by organizing conferences, training programs and workshops. Expert lectures are also organized by various departments from time to time to keep abreast with the latest developments in the field of science and technology.

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With best wishes for your continued success and growth.



Institute Vision

To establish a multi-disciplinary environment with excellence in technical education and research for developing competent professionals who meet the challenges of industrial and societal development with human values and ethics.



Institute Mission

- To provide an excellent environment with supporting infrastructure to prepare globally competent professionals acceptable to industry and society.
- To inculcate a spirit of research, innovation and entrepreneurship by exposing multi-disciplinary approach.
- To motivate aspiring graduates to solve real life problems with zeal of lifelong learning.
- To imbibe a healthy environment which helps to develop intellectual capabilities among graduates to transform them into professionals with human values and ethics.



Department's Vision

To provide a conducive environment for learning and create research opportunities in the field of Computer Science and Engineering to meet global requirements using the latest technologies with ethical values.



Department's Mission

- To provide theoretical and practical concepts across the Computer Science discipline.
- To impart an education that is well suited to meet the challenging software needs of the industry.
- To nurture the undergraduate students with multi-disciplinary and research activities to grow as professionals.
- To empower students with moral and ethical values.

PROGRAMME EDUCATIONAL OBJECTIVES

Program Educational Objectives (PEOs)

- To Encourage students to strengthen their technical capabilities for providing solutions to meet industrial and societal needs.
- To groom graduates as professional engineers to work with leadership and problem solving skills.

Program Outcomes (POs)

- PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems.
- PO2: Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Program Outcomes (POs) continued

- PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling too complex engineering activities with an understanding of the limitations.
- PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
- PO10: Communicate effectively on complex engineering activities with the engineering community and with the society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

A silhouette of a golfer in mid-swing on a golf course at sunset. The golfer is wearing a cap and gloves, and the background shows a dramatic sky with clouds and a body of water in the distance.

Program Specific Outcomes (PSOs)

- Ability to design and develop solutions for societal problems by using emerging technologies and standardized emerging principles.
- Develop an understanding for conceptual and practical aspects of programming languages with databases and develop solutions using suitable data structures and algorithmic techniques

Departmental Events & Seminars

CodeRush 1.0 – Coding Competition held at BBDNIIT



- Coding competition organised at BBDNIIT, New Block, Seminar Hall 708.
- Witnessed enthusiastic participation from 170+ students, bringing together young programmers to compete, solve challenging problems, and showcase their coding skills.

CodeRush 2.0 – 8 Hours Hackathon in BBD Campus

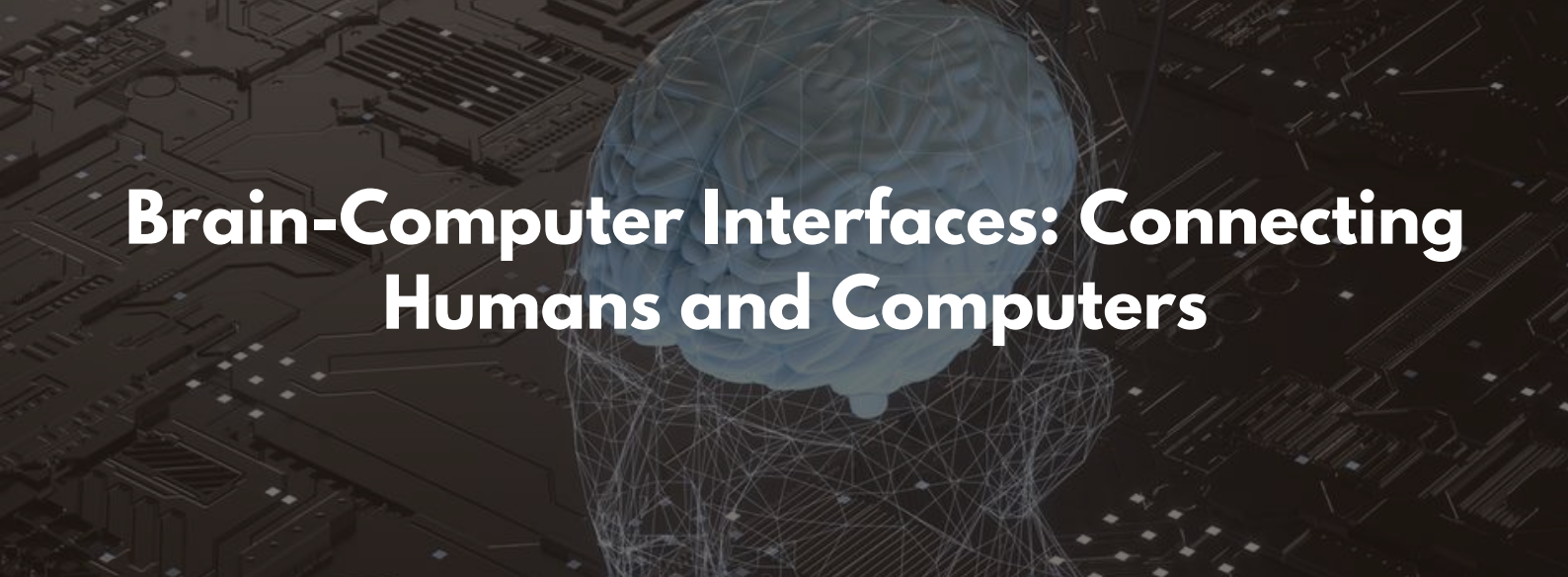


- Coding competition organised at the Dr. Akhilesh Das Gupta Auditorium, BBDNIIT.
- Witnessed an overwhelming participation of 500+ students, bringing together young programmers to compete, solve challenging problems, and showcase their coding skills.

Profile Building for High Value Placement and Higher Education – BBDNIIT



- Expert session on “Profile Building for High Value Placement and Higher Education” organised by the Department of Computer Science Engineering, BBDNIIT.
- Session delivered by Krati Yadav, Co-Founder & Director of AOO Seekhe International, held at Seminar Hall, Room No. 708, BBDNIIT.



Brain-Computer Interfaces: Connecting Humans and Computers

Introduction : A New Way to Interact with Technology

Technology has always aimed to make communication between humans and computers easier. Brain-Computer Interfaces (BCIs) take this idea a step further by creating a direct communication pathway between the brain and an external device. Instead of relying only on keyboards, touchscreens, or voice commands, BCIs can use brain signals to control technology.

How Does It Work?

A BCI records electrical or other measurable activity produced by the brain using sensors. These signals are processed by a computer, which identifies specific patterns and translates them into commands. For example, a particular brain signal could be interpreted as an instruction to move a cursor or control a robotic arm. BCIs can be non-invasive, using sensors placed on the scalp, or invasive, using implanted devices.

Transforming Healthcare

Healthcare is currently one of the most promising areas for BCI technology. BCIs could help people with paralysis or severe motor disabilities communicate and interact with computers.

Researchers are also exploring BCIs for controlling robotic prosthetic limbs, wheelchairs, and assistive communication systems. For people who cannot use traditional communication methods, a BCI could potentially translate intended actions into computer-generated text or other outputs.

Challenges and Ethical Questions

BCIs face several technical challenges. Brain signals can be weak and noisy, making them difficult to interpret accurately. Different people can also produce different signal patterns, meaning that systems may need personalisation.

There are also important concerns about privacy and data security. Brain-related data is highly sensitive, and protecting it from misuse will be essential as BCI technology develops.

What Does the Future Hold?

BCI technology is still in its developing stages, but research is progressing rapidly. Future systems may become smaller, more accurate, less expensive, and easier to use. Improvements in sensors, signal processing, machine learning, and computer hardware could make BCIs more practical.

For CSE, the field offers opportunities in machine learning, data processing, embedded systems, cybersecurity, software development, and human-computer interaction.

The long-term goal is not necessarily to replace traditional interfaces, but to provide new ways for people to communicate with machines when conventional methods are difficult or limiting.

Conclusion

Brain-Computer Interfaces represent a new direction in human-computer interaction. By translating brain activity into digital commands, BCIs could help people communicate, control devices, and interact with technology in ways that were previously difficult to imagine.

Their greatest potential currently lies in healthcare and accessibility, particularly for people with severe physical disabilities. At the same time, their future applications could extend to gaming, virtual environments, robotics, and everyday computing.

BCIs are still accompanied by technical, ethical, and privacy challenges, but continued research could make them an important part of future computing.

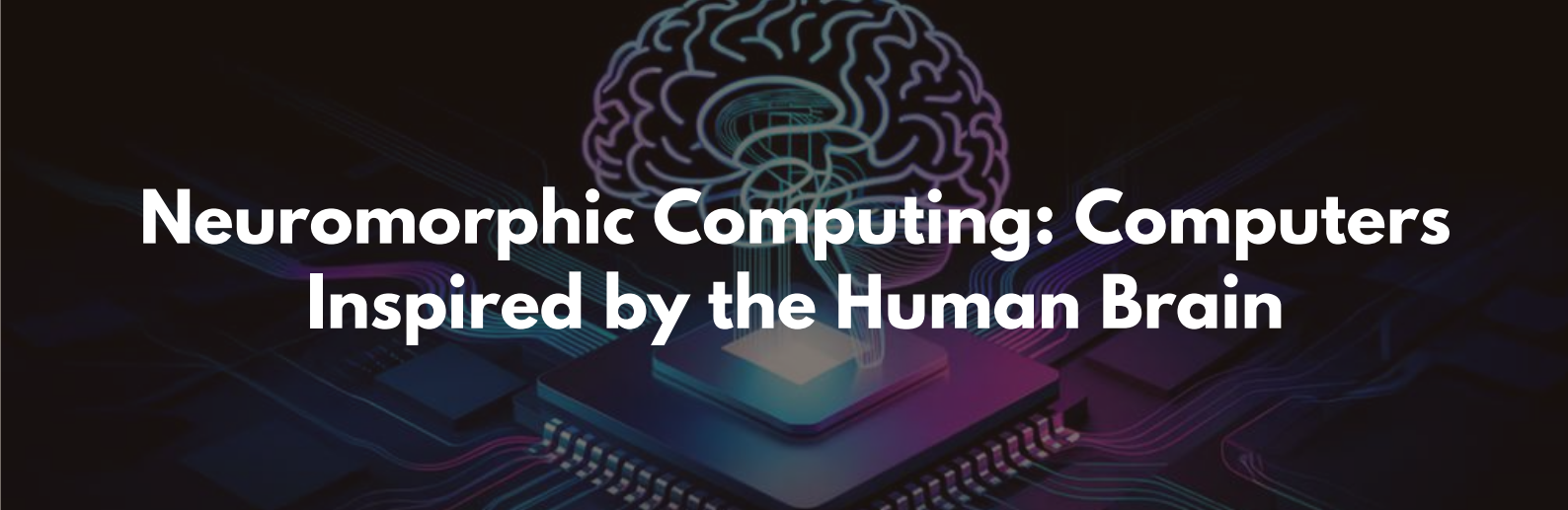
The future of human-computer interaction may not only depend on how we touch, type, or speak to computers, but also on how directly we can communicate with them.

As BCI technology continues to develop, its impact could extend far beyond simply controlling a computer. In the future, BCIs may become an important part of assistive technology, allowing people with physical limitations to interact with their surroundings more independently. They could also work alongside robotics, wearable devices, and virtual environments to create more natural forms of interaction.

Author: Dr. Anurag Shrivastava

Professor and Head

Department of Computer Science & Engineering



Neuromorphic Computing: Computers Inspired by the Human Brain

Introduction

Computers have traditionally been designed to perform calculations using a sequential, logic-based architecture. However, the human brain works very differently. It can process enormous amounts of information simultaneously while consuming remarkably little energy. Neuromorphic computing is an emerging field of computer science that attempts to imitate the structure and functioning of the human brain in computer hardware and software.

The term neuromorphic combines “neuron” and “morphic,” meaning “neuron-shaped” or “brain-inspired.” Instead of relying entirely on conventional processors, neuromorphic systems use artificial neurons and synapses to process information in a way that resembles biological neural networks.

How Does Neuromorphic Computing Work?

Traditional computers generally separate memory and processing. Data moves between the processor and memory, which requires time and energy. Neuromorphic systems attempt to overcome this limitation by bringing computation and memory closer together.

They use electronic circuits that mimic neurons and synapses. These systems often operate using spikes, brief electrical signals that resemble the way biological neurons communicate. This approach is known as Spiking Neural Networks (SNNs).

Another important feature is event-driven processing. Instead of continuously processing every piece of information, a neuromorphic system responds mainly when a meaningful event occurs. This can significantly reduce unnecessary computation and energy consumption.

Why Is It Important?

One of the biggest advantages of neuromorphic computing is energy efficiency. Modern AI and computing systems can require large amounts of electricity, especially when processing huge volumes of data. Brain-inspired hardware could perform certain tasks using much less power.

Neuromorphic systems can also provide low-latency processing, making them useful for applications that require immediate responses. Because processing can occur locally on a device, they can reduce dependence on cloud servers and minimize the need to constantly transfer data.

Applications

Neuromorphic computing has potential applications in robotics, autonomous vehicles, healthcare, smart sensors, cybersecurity, and wearable devices. For example, a robot equipped with neuromorphic hardware could process information from cameras and sensors locally and react quickly to its surroundings.

In healthcare, brain-inspired systems could potentially help process neurological signals such as those obtained from brain-computer interfaces. In smart devices, neuromorphic chips could allow continuous sensing while consuming very little energy.

Challenges and Future Scope

Despite its potential, neuromorphic computing is still developing. Designing reliable artificial neurons and synapses, developing suitable programming tools, and creating efficient algorithms remain major challenges. Neuromorphic systems also do not automatically outperform conventional computers; their advantages are strongest for particular types of workloads.

Nevertheless, the field could become increasingly important as computing moves toward energy-efficient, real-time, and edge-based processing.

Instead of simply making computers faster, neuromorphic computing explores a different question: *Can we make computers work smarter by learning from the architecture of the brain?*

Conclusion

Neuromorphic computing represents a fascinating shift from traditional computer architecture toward brain-inspired computing. By combining artificial neurons, synapses, event-driven processing, and spiking neural networks, it aims to create systems that are fast, adaptive, and energy-efficient. Although significant technical challenges remain, neuromorphic computing could play an important role in the future of robotics, healthcare, smart devices, and next-generation computing.

The goal is not to create a machine that literally becomes a human brain, but to learn from one of nature's most efficient information-processing systems and use those principles to build better computers.

Author: Sanjana Riya

2400560100177

Department of Computer Science & Engineering



Green Computing: Making Technology More Sustainable

What If Technology Could Leave a Smaller Footprint?

Technology has transformed the way we live, learn, communicate, and work. But behind every smartphone, laptop, server, and data centre lies an environmental cost. From the electricity consumed by computers to the mountains of electronic waste produced every year, the digital world has a growing impact on our planet. Green Computing aims to change this.

Green computing refers to designing, using, and disposing of computers and other technological systems in an environmentally responsible way. Its goal is simple: use technology while consuming fewer resources and creating less environmental damage.

Less Energy, More Efficiency

One of the biggest focuses of green computing is reducing energy consumption. Energy-efficient processors, low-power devices, virtualization, and energy-conscious data centres can significantly reduce electricity usage. Software also plays a role—efficient code can require fewer computational resources and therefore less energy.

The Problem Beyond the Screen

Green computing is not only about electricity. Electronic waste (e-waste) is another major concern. Old computers, phones, batteries, and other electronic devices contain valuable materials as well as substances that can harm the environment if improperly discarded. Recycling, repairing, reusing, and designing longer-lasting devices can help reduce this problem.

Greener Data, Greener Future

Cloud computing and modern data centres consume enormous amounts of electricity. Using renewable energy, efficient cooling systems, server virtualization, and smarter resource management can make these infrastructures more sustainable.

Can Technology Save the Planet?

Green computing shows that technological progress and environmental responsibility do not have to be opposites. By building energy-efficient hardware, writing efficient software, reducing e-waste, and powering digital infrastructure with cleaner energy, the CSE community can contribute to a more sustainable future.

The future of computing should not simply be faster and smarter—it should also be greener.

Conclusion: The Future Should Be Smart—and Green

The digital revolution has changed the world, but its next chapter should focus not only on what technology can do, but also on what it should do.

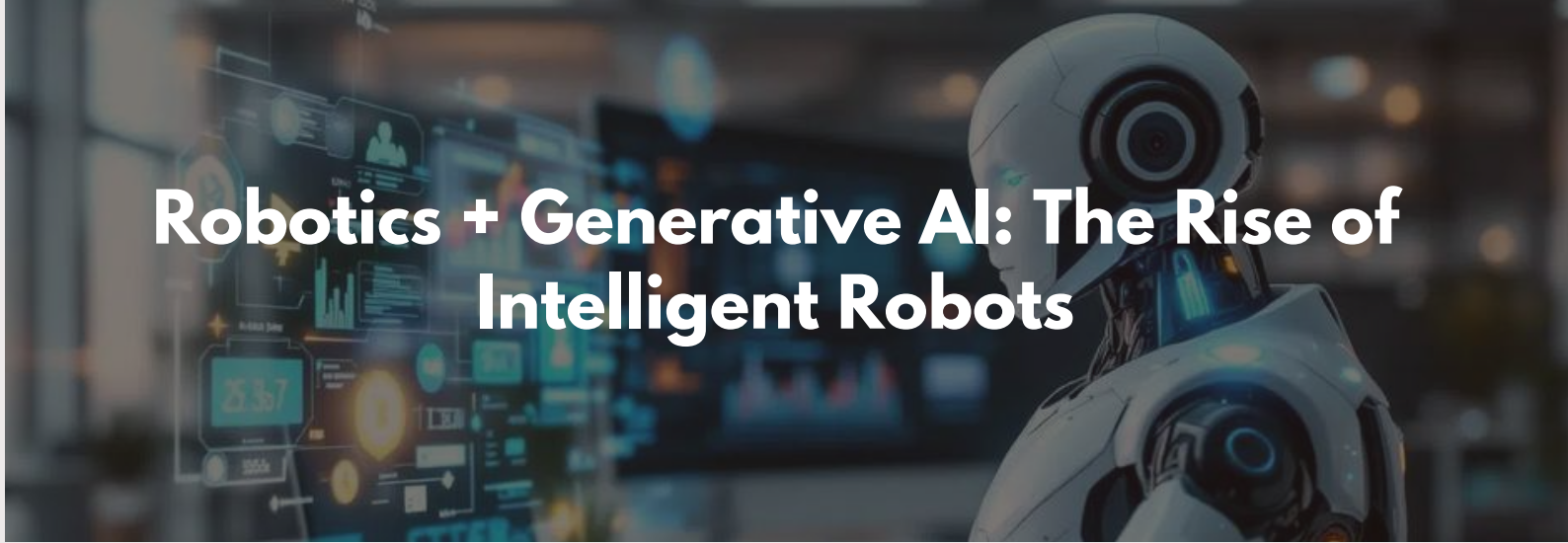
Green computing provides a path toward a more responsible digital future by addressing energy consumption, e-waste, efficient software, sustainable hardware, data-centre infrastructure, and renewable energy.

The goal is not to slow technological progress. Instead, it is to make progress more sustainable.

Author: Shubh Pathak

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Department of Computer Science & Engineering



Robotics + Generative AI: The Rise of Intelligent Robots

Introduction: When Robots Become Smarter

Robots have been used for many years in factories, hospitals, warehouses, and other industries. Traditionally, most robots were designed to perform specific tasks based on fixed instructions. They could repeat the same action accurately but had limited ability to understand changes in their surroundings.

The development of Generative AI is changing this. When AI is combined with robotics, robots can potentially understand language, recognise objects, analyse their surroundings, plan tasks, and interact with people more naturally.

From Fixed Instructions to Flexible Tasks

Traditional robots usually work according to predefined instructions. For example, a manufacturing robot may be programmed to pick up a component and place it at a particular location. If the position of the component changes significantly, the robot may need to be reprogrammed.

Generative AI can make robots more flexible. AI models can help robots understand natural-language instructions and use information from cameras and sensors to make decisions.

How Do AI-Powered Robots Work?

An intelligent robot depends on several technologies working together.

Computer vision allows the robot to understand images and identify objects, people, and surroundings. Natural language processing helps it understand spoken or written instructions. Sensors provide information about distance, movement, pressure, and the environment.

Generative AI can then help process this information and create a plan for completing a task. Finally, the robot's control system converts that plan into physical movements.

A simplified process can be understood as:

Observe → Understand → Plan → Act → Check the Result

This combination of perception, reasoning, and physical action is one of the major areas of research in modern robotics.

Humanoid Robots and Generative AI

Humanoid robots are receiving increasing attention because their body structure is designed around environments created for humans. Doors, stairs, tools, and many workplaces are designed for human movement.

Generative AI can potentially make these robots more useful by helping them understand instructions and respond to changing situations.

Companies and research organisations are developing AI models specifically for robotics. For example, Google DeepMind has introduced Gemini Robotics models that connect AI capabilities with physical robotic systems, while NVIDIA has developed foundation-model technologies for humanoid robots.

Conclusion

The combination of Robotics and Generative AI is creating new possibilities for machines that can understand, learn, and interact with their surroundings.

Traditional robots are excellent at performing specific tasks repeatedly, while Generative AI can provide greater flexibility in understanding information and instructions. Combining these strengths could make robots more useful in manufacturing, healthcare, agriculture, warehouses, disaster management, and eventually homes.

Author: Saumya Singh

2400560100182

Department of Computer Science & Engineering

HALL OF FAME

STUDENT OF THE YEAR 2026

- **Sanjana Keshari** (4th year) CSE student, has been honored with the **Student of the Year 2026** award in recognition of her outstanding dedication, leadership, and consistent excellence throughout her academic journey.
- Her remarkable contributions to both academics and co-curricular activities have set a benchmark for her peers.
- Through her commitment, perseverance, and passion for growth, she has truly embodied the spirit of excellence and has become an inspiration for the entire student community.



LITERARY GURU 2026



- **Kshitiz Sengar** (3rd year) CSE student, has been awarded the prestigious **Literary Guru 2026** for his exceptional contribution to the literary culture of the institution.
- Known for his depth of thought, eloquence, and leadership within literary activities, he has played a vital role in guiding and inspiring fellow students.
- His dedication to literature and mentorship has significantly strengthened the creative and intellectual environment of the society.

"The future belongs to those who turn knowledge into innovation and effort into excellence."

OUR TOPPERS

Our Final Years (4th Year)

S H R U T I S A R O V E R

3rd Year

K S H I T I Z S E N G A R

2nd Year

S H I B Y A P A N D E Y

"Strive not to be a success, but rather to be of value."



Stock Exchange Web Application

A Web-Based Simulated Trading Platform for Risk-Free Stock Market Learning

Research Paper

Authors: Mr. Satendra Kumar Vishwakarma, Kshitiz Kumar Shukla, Prince Mishra, Raj Kumar Srivastava, Harsh Dubey, Mohammad Shafeek

Publishing Journal: International Journal of Innovative Research in Technology (IJIRT)

Volume: 12 | Issue: 11 | April 2026

ISSN: 2349-6002

Paper ID: IJIRT 199035

Keywords: Stock Exchange, Web Application, Stock Market Simulation, Portfolio Management, Virtual Trading, Financial Technology, Risk-Free Trading, Online Trading.

Abstract: The growth of financial technology has transformed traditional stock trading into digital platforms. However, existing trading applications can be complex for beginners and often require real financial investment. This research presents a Stock Exchange Web Application that replicates real-world trading in a safe and user-friendly simulated environment. The system provides features including dynamic stock price simulation, portfolio tracking, transaction history, and buying and selling operations. By eliminating financial risk, the platform enables beginners to gain practical knowledge of stock market concepts and trading operations. The application follows a client-server architecture and incorporates secure authentication, market simulation, portfolio management, trading operations, and administrative controls. The proposed system demonstrates how modern web technologies can simplify financial concepts and provide an interactive, scalable, and educational platform for learning stock trading.

AI-Powered Auto Challan System

A Comprehensive Literature Survey on AI-Based Traffic Violation Detection and Automated Challan Generation

Research Paper

Authors: Ashutosh Singh, Kripa Shankar Pathak, Niraj Kumar, Prabhat Vishwakarma, Pratyush Kumar Tiwari

Publishing Journal: International Research Journal of Modernization in Engineering Technology and Science (IRJMETS)

DOI: 10.56726/IRJMETS87464

Keywords: Artificial Intelligence, Auto Challan, Traffic Violation Detection, Computer Vision, Vehicle Detection, ANPR, OCR, Deep Learning, Helmet Detection, Traffic Management

Abstract: Traffic congestion and road-rule violations are significant challenges in modern urban environments, while conventional traffic enforcement systems rely heavily on manual monitoring. This paper presents a comprehensive literature survey of AI-powered auto challan systems that automate traffic violation detection and electronic challan generation. The study reviews techniques including deep learning-based vehicle detection, Automatic Number Plate Recognition (ANPR), Optical Character Recognition (OCR), red-light violation detection, and helmet and seatbelt detection. A comparative analysis of existing methodologies highlights their accuracy, scalability, and limitations. The paper also examines challenges such as poor lighting, adverse weather conditions, vehicle occlusion, real-time processing requirements, and data privacy concerns. The study identifies key research gaps and future directions for developing robust, scalable, real-time, and privacy-aware AI-based traffic enforcement systems.

Artificial Intelligence Voice Assistant

A Multimodal AI-Powered Voice and Text Assistant for Intelligent Interaction and Desktop Automation

Research Paper

Authors: Himanshu Rai, Asmit Mishra, Divyanshu Rai, Mr. Krishna Kumar Joshi

Publishing Journal: International Research Journal of Modernization in Engineering Technology and Science (IRJMETS)

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Keywords: Voice Assistant, Speech Recognition, Text-to-Speech, Perplexity AI, FastAPI, Multimodal Interaction

Abstract: This research presents an AI Voice Assistant designed to provide intelligent interaction through both spoken and typed queries. The system uses a wake word, "nova," for voice activation and employs Google Speech API for speech recognition. A FastAPI-based Python backend processes user queries and integrates Perplexity's Sonar-Pro LLM to generate real-time, citation-aware responses. The assistant converts responses into speech using gTTS and Pygame and can also perform practical desktop operations such as opening websites, playing YouTube videos, and reporting the current time. The system follows a modular client-server architecture with HTML/CSS/JavaScript or Electron as the frontend. Specialized Chat, Build, Study, and Research modes provide context-aware assistance. The study also addresses challenges including API rate limits, connectivity, and reliability, with error handling and model fallback mechanisms proposed to maintain functionality.

Personalization and Recommendation Systems in E-Commerce Platform

A MERN Stack-Based E-Commerce Platform with Secure Authentication, Personalized Recommendations, and Efficient Online Shopping

Research Paper

Authors: Saurabh Vishwakarma, Utkarsh Srivastava, Suryansh Maurya, Shashank Tiwari, Shashank Kumar Chaudhary

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DOI: 10.56726/IRJMETS87907

Keywords: HTML, CSS, JavaScript, React, Python, Node.js, Express.js, MongoDB, MERN Stack, Processing Algorithms

Abstract: This research presents the development of a modern E-Commerce Platform using the MERN stack, comprising React.js, Node.js, Express.js, and MongoDB. The system is designed to provide users with a secure, responsive, and user-friendly online shopping experience. Core functionalities include user registration and authentication, product search and filtering, cart management, secure checkout, order processing, and payment integration. The architecture separates the frontend, backend, and database layers, with RESTful APIs facilitating communication and JSON Web Token (JWT) supporting authentication and authorization. The platform is designed for smooth operation across mobile, tablet, and desktop devices. Testing demonstrated effective user authentication, product search and sorting, cart and order management, payment processing, and stable inventory handling. The research also identifies limitations related to network conditions, scalability, third-party payment services, security, recommendation speed, and storage requirements, while proposing future improvements through machine learning, mobile application support, enhanced security, and improved personalization.

From the Editors Pen.....

Dear Readers,

It is with immense pride and heartfelt excitement that we present to you the inaugural edition of our departmental magazine, Techvishta! This debut release is a vibrant volume, woven with the threads of innovation, technical excellence, and the dynamic spirit that defines the Department of Computer Science and Engineering at BBDNIIT.

Our dedicated editorial team has poured their heart and soul into every page of this publication. We have meticulously captured the pulse of our department—from the academic brilliance in our classrooms to the cutting-edge advancements in our campus labs. This edition highlights the vibrant energy of our student societies and the relentless passion of our technical teams, who continue to push the boundaries of what is possible.

Techvishta stands as a beacon of the tireless efforts and unwavering commitment of our students and faculty. Within these pages, you will find a record of our collective journey:

- Academic Milestones: Celebrating the research and publications that strengthen our foundation.
- Technical Synergy: Showcasing workshops on Python, Salesforce, and Mobile App Development that bridge the gap between theory and industry.
- Innovation & Spirit: Capturing the drive of our Hackathon winners and the vision of our budding entrepreneurs.

This magazine is more than just a publication; it is a celebration of our dreams and the unyielding spirit of the BBDNIIT family. As you journey through these pages, we invite you to feel the pulse of our department and embrace the shared vision that propels us toward greater heights.

Thank you for being part of this incredible journey. Here's to new beginnings, endless possibilities, and the boundless potential of the CSE department!

With Heartfelt Gratitude,

The Editorial Team

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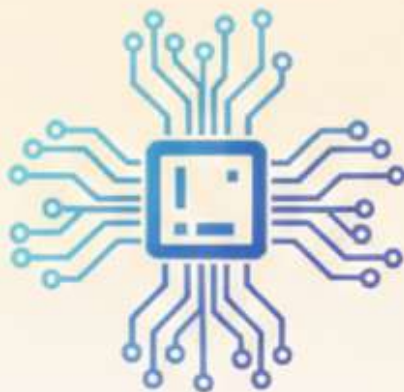


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"Do the best you can until you know better.
Then when you know better, do better."



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