GiGA CHRONICLES

Annual Tech Magazine

SPATIAL COMPUTING & MIXED REALITY INTERFACES WILL REPLACE *Screens*

CANARA ENGINEERING COLLEGE

An Autonomous Institution, Approved by **AICTE**, Accredited by **NAAC** with **A** Grade

SUDHINDRA NAGARA, BENJANAPADAVU, BANTWAL, MANGALURU – 574219

Giga Chronicles

EDITORIAL

Chief Editor

Dr. Nagesh H R
Principal

Dr. Karthik Pai B H
Professor & HoD, Dept. of CSE

Dr. Demian Antony D'Mello
Professor & Dean Academics

Adithya M
Chairman
Assistant Prof., Dept. of CSE

Dinesh Suvarna
Programmer, Dept. of CSE

STUDENT MEMBERS

Chaturthi H V
4CB24CS028

Mohith J Karkera
4CB24CS082

Suhas S Pai
4CB24CS155

Vaibhav Hardikar
4CB24CS170

Gurudev Krishnanand Kini
4CB23CS062

Moolya Praveekhsa Narayan
4CB23CS094

Vaidehi V Pai
4CB23CS180

Abheeshta P
4CB22CS001

VISION

To be recognized as a center of knowledge dissemination in Computer Science and Engineering by imparting value-added education to transform budding minds into competent computer professionals.

MISSION

➤ Provide a value-based learning environment enriched with ethics, honesty and integrity that equips students to cater to the needs of society and industry.

➤ Augment the knowledge of students towards cutting-edge technologies and state-of-the-art tools of Computer Science & Engineering.

➤ Create opportunities for all-round development of students through co-curricular and extra-curricular activities.

➤ Promote research, innovation and development activities in the field of Computer Science among staff and students without any bias.

DEPARTMENT PROFILE

The department was started in the year 2001 to offer undergraduate degree programme i.e Bachelor of Engineering (BE) in Computer Science & Engineering (CS&E). The department has dedicated, qualified and experienced faculty members to guide the students in academics. The faculty members are actively involved in teaching, product development and research. The faculty members have published number of research and review papers/articles in referred International journals and reputed International conferences which are archived at IEEE/ACM/Springer and other renowned digital libraries.

The department frequently organizes training programmes for the faculty, technical staff and students. The faculty frequently attends staff development programmes (SDP/FDP/Seminar) to update themselves in technological advancements and conferences to present research findings.The department aims at building the students' career by placing special emphasis on all-round development through continuous interaction with Industry.

Interactive sessions with experts from academia, research laboratories and industry are constantly held so as to enable students to gain knowledge on diverse and emerging fields. The campus placement has been scaling higher and higher peaks right from its inception with multinational companies recruiting students in large numbers. To increase the opportunity of placements to students, the department conducts soft skills training programmes, technical skill development activities and initiatives on self-learning (Spoken Tutorial programmes by IIT Bombay).

The department promotes extracurricular activities under the umbrella of the students' association & SPECS. The department brings out Annual technical magazine and newsletter which provides an opportunity for the students and staff to publish innovative ideas, programming tips and articles on current trends in computing and technology. The students'association and National Service Scheme (NSS) wing frequently conducts various programmes to strengthen leadership skills, teamwork and communication; and awareness on protection of environment and social responsibilities.

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- Graduates will work productively as computer science engineers exhibiting ethical qualities and leadership roles in multi-disciplinary teams.

- Graduates will adapt to the changing technologies, tools and societal requirements.

- Graduates will design and deploy software that meets the needs of individuals and the industries.

- Graduates will take up higher education and/or be associated with the field so that they can keep themselves abreast of Research & Development.

PROGRAMME OUTCOMES (PO)

Engineering graduates in Computer Science and Engineering will be able to:

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

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.

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.

Modern tool usage: Select/Create and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling to complex engineering activities, taking comprehensive cognizance of their limitations.

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.

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.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the relevant scientific and/or engineering practices.

Individual and team work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

Communication: 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.

Project management and finance: 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.

Life-long learning: Recognize the need for and above have the preparation and ability to engage in independent and life-long learning in the broadcast context of technological changes.

PROGRAMME SPECIFIC OUTCOMES (PSO)

Computer System Components: Apply the principles of computer system software engineering to design, develop and deploy computer subsystems.

Intelligent Internet Applications: Apply the knowledge of data storage, analytics and internet architecture in designing Internet based application.

Innovations that made the Engineers proud

Photonic Neuromorphic Chips Bring Brain-Like Speed to Vision Processing

Date: June 17, 2025   **Source: arXiv (Silicon Photonic Neuromorphic Computing Research Group)**

A groundbreaking neuromorphic photonic chip has been introduced by researchers in 2025: a GHz scale spiking photonic processor capable of in-situ learning and retina-inspired event-based encoding. The work, published as "GHz Spiking Neuromorphic Photonic Chip with In-Situ Training," demonstrates how photonic components operating at the speed of light can finally make real-time neuromorphic computing practical.

Tests on video-recognition datasets reveal:
- **100x lower latency compared to frame-based computing**
- **Ultra-low energy consumption**
- **Dynamic spiking behaviors similar to biological neurons**

By directly processing continuous streams of events, instead of images frame by frame, these chips could power real-time vision for autonomous drones, AR glasses, robotics, and high-speed industrial systems.

Why engineers take pride: this closes a long-standing gap. Photonic computing + neuromorphic (brain-inspired) design has been theorized for years; actually, building a scalable, learning-capable photonic SNN on silicon is a big leap toward practical, high-speed, energy-efficient edge AI potentially transformative for robotics, drones, AR/VR, autonomous systems, real-time industrial sensing, etc.

Researchers emphasize that combining neuromorphic principles with silicon photonics may be the key to achieving brain-level speed and efficiency.
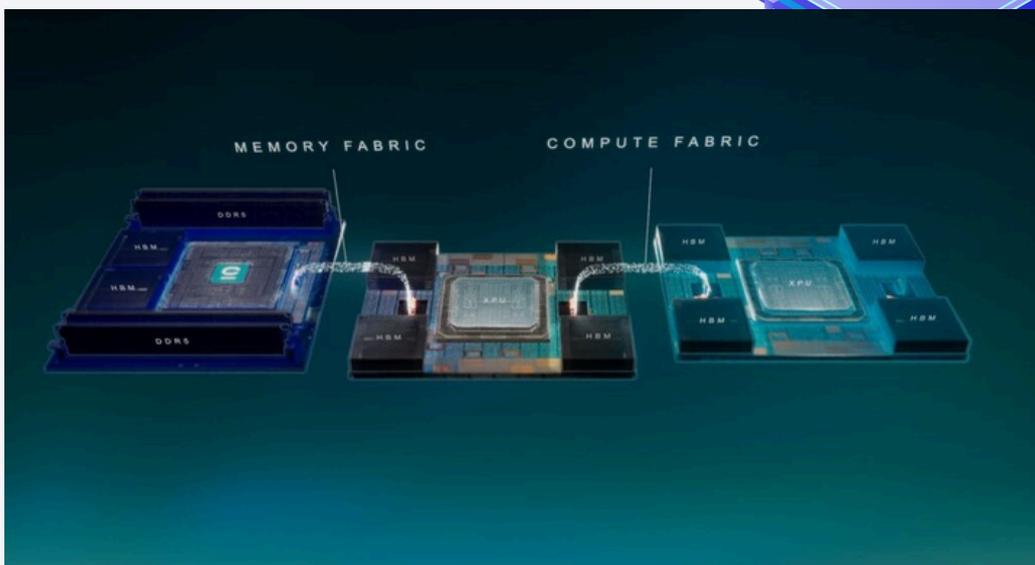
Photonic neuromorphic chip, "Image courtesy of Marvell Technology, from the 'Marvell Custom HBM Compute Architecture' press release (December 2024)."
Credit: Authors of the 2025 arXiv publication

Article Credit: **Sanjay G Kamath 4CB22CS111**

Next-generation memristors for neuromorphic memory and in-memory AI computing

Date: January 2025

Source: Nano-Micro Letters (Springer Nature)

A major 2025 peer-reviewed article titled "Low-Power Memristor for Neuromorphic Computing: From Materials to Applications" presented a comprehensive look at how new memristor technologies are pushing forward neuromorphic computing.

Memristors, which can store and process information simultaneously, allow AI systems to escape the bottleneck of classical CPUs. The paper demonstrates the viability of advanced architectures such as:

🧩 1T1R and 1S1R arrays for stable memory switching.

🔗 Crossbar arrays for parallel matrix operations (ideal for deep learning)

🧠 Analog resistance programming, enabling neuron- and synapse-like behavior

🔋 Ultra-low power operation, crucial for edge AI devices

The authors show how optimized material stacks including metal oxides and two-dimensional materials drastically improve reliability, switching uniformity, and endurance.

What engineers love: memristors dramatically reduce energy consumption (compared to classical digital memory + compute combinations), shrink hardware footprints, simplify integration, and bring us closer to brain-like efficiency. This is especially important for edge AI, low-power devices, robotics, IoT, embedded AI, where energy and area are precious.

Essentially, memristor-based neuromorphic memory/compute units turn long-theoretical gains into realistic hardware platforms, a major enabler for efficient, compact AI hardware. These improvements bring memristor-based "memory-processing units" closer to mass adoption in edge devices, autonomous systems, and AI accelerators.
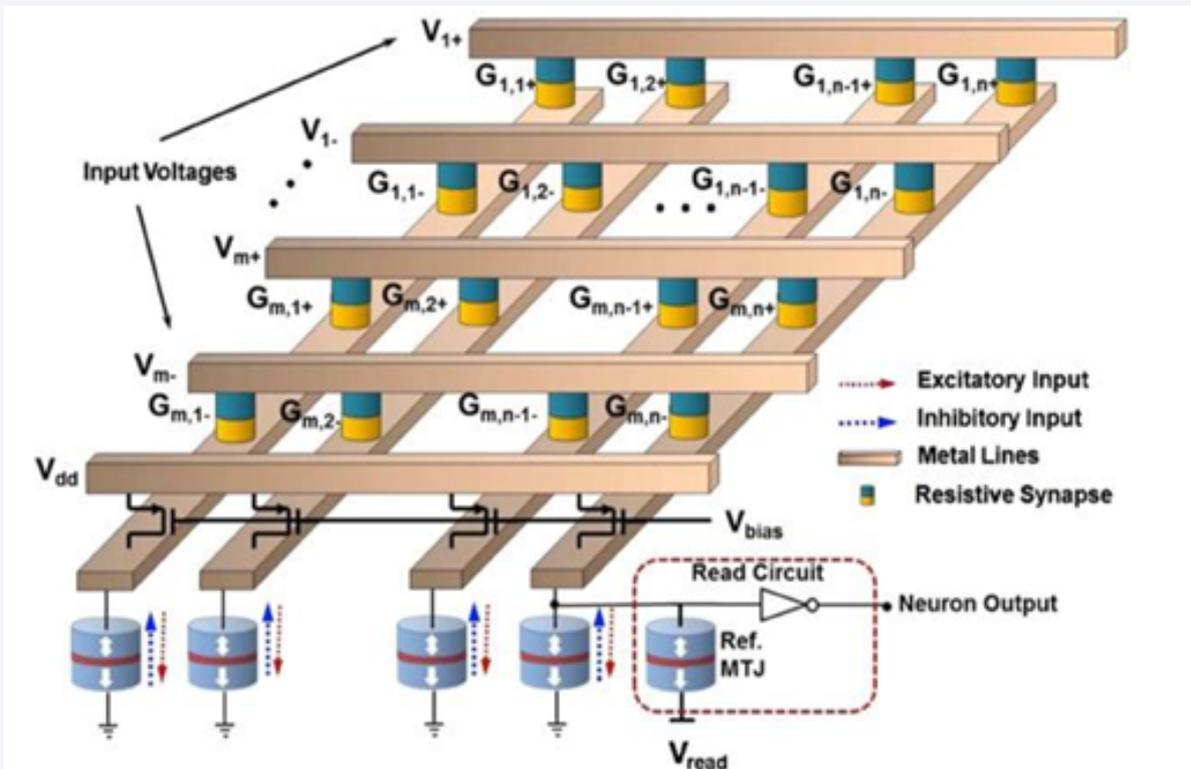
Crossbar memristor array for neuromorphic processing
Credit: Nano-Micro Letters (Springer Open), Neuromorphic Computing with Memristor Crossbar

Article Credit Dhanya G Prabhu 4CB22CS038

AI discovers new foundational algorithms machine-generated code enters the C++ standard library

Date: June 7, 2023 (impact continued into 2024–2025)   **Source: Google DeepMind, Nature / ISO C++ committee**

Google DeepMind's **AlphaDev** achieved an unprecedented milestone by discovering sorting and hashing algorithms that are faster and more efficient than those developed by human experts over decades. By applying reinforcement learning at the **assembly-instruction level**, AlphaDev identified novel instruction sequences that significantly reduce instruction count, improve execution speed on modern hardware, and generalize more effectively for small-input sorting tasks. The approach also led to notable breakthroughs in hashing performance.

Following rigorous verification and evaluation, the **ISO C++ standards committee** accepted AlphaDev's algorithms into **libc++**, marking the **first time in history** that machine-discovered algorithms have been incorporated into the standard library of a major programming language.

Why this matters: Core utilities like sorting or hashing are used everywhere, by operating systems, compilers, databases, software frameworks, large-scale cloud systems. An AI improving these low-level building blocks means performance and energy savings at massive scale, across almost all software, without changing any application code.

Credit: DeepMind

🧠 **Neuromorphic Efficiency**

Neuromorphic chips can potentially achieve up to 1000× lower energy consumption than GPUs for event-based computing tasks.

⚙️ **Rise of the Memristor**

Although the first working memristor was built only in 2008, it became a core component of neuromorphic hardware by 2025.

✉️ **The Spam Reality**

More than 80% of global email traffic continues to be spam—a figure that has remained largely unchanged for over a decade.

🔡 **A Rare Algorithmic Breakthrough**

AlphaDev's 2023 discovery marks the first major improvement to core C++ sorting algorithms in over 10 years.

⚡ **Speed of Light Computing**

Photonic computing can operate at picosecond switching speeds, far exceeding what electron-based silicon circuits can achieve.

Why 2025 Matters: A New Era of Computing

The three cases above – photonic neuromorphic hardware, and AI-generated fundamental algorithms – collectively signal a maturing of ideas that were once speculative or experimental. By 2025, these ideas are starting to coalesce into tangible systems, tools, and standards.

- What once was purely academic (neuromorphic computing, quantum memory) is now showing practical viability.
- AI has stepped out of "application layer" roles (e.g. classification, recognition) and entered the infrastructure layer – shaping the very way computers compute.
- There is growing convergence across hardware paradigms – quantum, neuromorphic, photonic – which may herald hybrid architectures unlocking unprecedented computational power, energy efficiency, and adaptability.

For engineers and researchers, these developments mark not just incremental progress, but a foundational shift. The future of computing may increasingly look less like traditional CPUs and GPUs, and more like brain-inspired, quantum-aware, AI-designed systems. That's a 2025 worth being proud of.

Article Credit	K Adithya Bhaktha 4CB22CS052
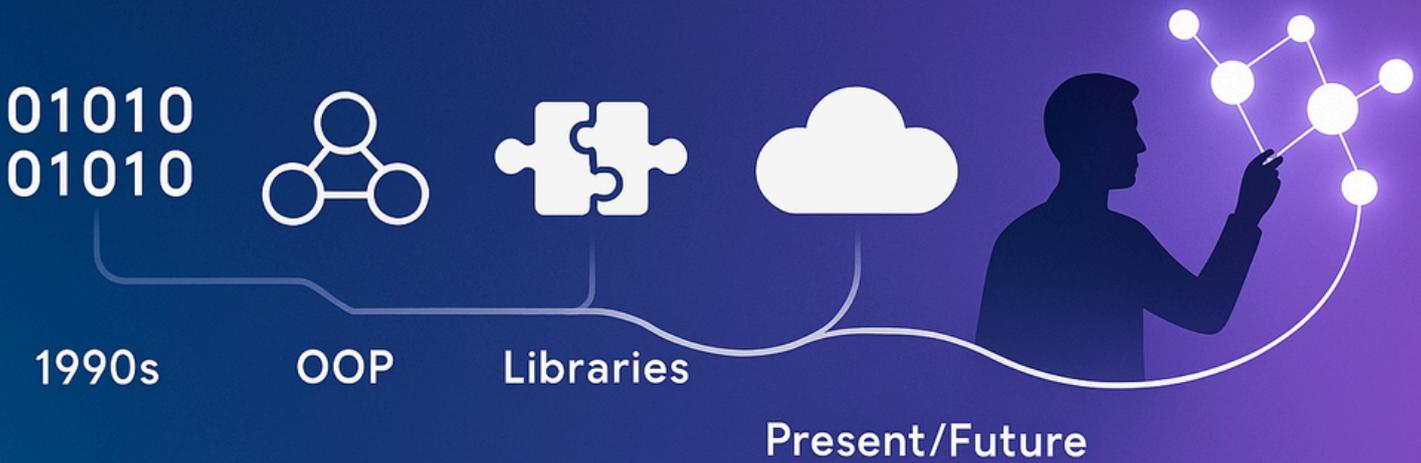
Trending Technologies

AI & EDGE INTELLIGENCE: FROM GIANT MODELS TO LEAN, SMART DEVICES

In 2025, artificial intelligence is no longer confined to massive data centers and gargantuan models we are witnessing a shift toward edge intelligence and energy-efficient AI systems, bringing powerful AI closer to end-users and embedded devices. A key exemplar is a 2025 research publication describing a neuromorphic computing framework that combines spiking neural networks (SNNs) with memristor-based architectures. This system delivers remarkable efficiency: up to 70% lower power consumption while improving latency and adaptability compared to classical deep-learning on edge devices.

Why this matters: with the proliferation of IoT devices, mobile sensors, wearable health monitors, and embedded systems in homes and cities all resource-constrained environments edge-AI must be efficient, adaptive, and privacy-preserving. The memristor-based neuromorphic approach helps avoid expensive data transfers and cloud dependency, enabling real-time inference, lower latency, and reduced energy footprint.

Moreover, such advances bring AI-powered capabilities to devices and regions previously constrained by bandwidth, cost, or infrastructure – potentially democratizing intelligent systems globally. As edge-AI becomes more commonplace, expect to see AI not just in smartphones or servers, but in everyday sensors, home automation, healthcare wearables, industrial IoT systems, and smart-city infrastructure.

DID YOU KNOW

- **Some edge-AI chips now consume only a few milliwatts during inference, enabling weeks-long battery life in wearables while running real-time AI.**
- **In some neuromorphic prototypes, spiking networks achieve real-time reaction times (< 5 ms) for critical tasks like anomaly detection or sensor-triggered decisions — faster than human response time in some scenarios.**

Article Credit | Hafeez Mohammad 4CB23CS063

QUANTUM COMPUTING & QUANTUM-ENABLED SYSTEMS: FROM LABORATORY TO EARLY PRODUCTION

Quantum computing has long promised to revolutionize computing and as of 2025, that promise is moving closer to reality. A major milestone is the release of the Willow processor by Google Quantum AI in December 2024. Willow is a 105-qubit superconducting quantum processor that demonstrates scalable quantum error correction: its design reportedly allows error rates to shrink exponentially as qubit count increases.

One of Willow's landmark achievements is it completed a Random Circuit Sampling (RCS) benchmark task in 5 minutes, a task that today's top classical supercomputers would require an estimated 10^{25} years to finish. This result signals a credible demonstration of quantum advantage i.e. a quantum system doing something practically infeasible for classical machines.

Beyond raw speed, quantum systems are also influencing cryptography, security, and hybrid computation. For instance, the company Quantinuum has developed a quantum-origin cryptographic key system called Quantum Origin which generates cryptographically strong keys resistant to quantum attacks. This is helping organizations transition toward post-quantum cryptography before quantum computers become powerful enough to break conventional encryption.


Further, the intersection of AI and quantum computing is gaining traction. A 2024 preprint titled Artificial Intelligence for Quantum Computing explores how AI techniques can accelerate quantum-device design, error mitigation, and quantum algorithm discovery, effectively bridging two of the most challenging fields in CS.

As quantum-enabled tools mature, we can expect early real-world applications: complex optimization problems, advanced cryptographic protocols, molecular simulations for drug/material design, and hybrid classical–quantum workloads especially in scientific research, finance, and materials science.

Amazing fact:

Willow's 105 qubits already enable tasks beyond the reach of classical supercomputers, raising prospects for **practical quantum computing within next few years**.

Quantum-hardened cryptography, such as Quantum Origin, is being offered to enterprises now – meaning some organizations are already "quantum-ready," long before large-scale quantum computers become common.

Article Credit	Ananya G Bhat 4CB23CS019
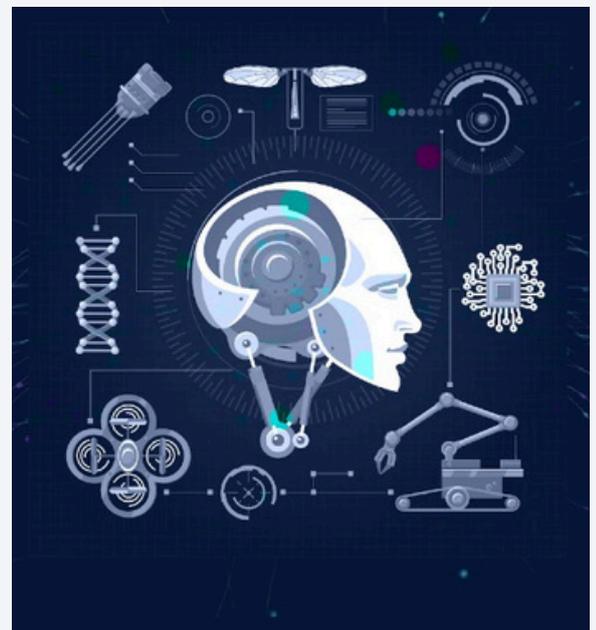
RENOWNED PERSONALITY IN INDIA

Sundar Pichai – Architect of the Modern AI-Driven Google

Pichai Sundararajan, globally known as Sundar Pichai, is one of India's most influential figures in the computer-science and global technology landscape. Born on June 10, 1972, in Madurai, Tamil Nadu, Pichai's career reflects a remarkable journey from a modest middle-class household to becoming the CEO of Google (2015-present) and later the CEO of its parent company, Alphabet Inc. (2019-present). His leadership continues to shape the direction of modern computing and artificial intelligence in 2025.

Sundar Pichai completed his early schooling at Jawahar Vidyalaya in Chennai and later earned a degree in Metallurgical Engineering from IIT Kharagpur, where he was awarded the institute's prestigious silver medal. Demonstrating academic brilliance, he continued his studies at Stanford University, where he pursued an M.S. in Material Sciences and Engineering, followed by an MBA from the Wharton School, University of Pennsylvania. There, he was recognized as both a Siebel Scholar and a Palmer Scholar, honors awarded to exceptional students.

Pichai joined Google in 2004, a foundational period in the company's history. His early work included spearheading the development of the Google Toolbar, which played a crucial role in increasing Google Search adoption across browsers. His most pivotal contribution came soon after: leading the development of Google Chrome, launched in 2008. Chrome quickly became the world's most widely used web browser, surpassing longstanding competitors and setting standards for speed, security, and simplicity. This achievement remains one of the most cited examples in business and technology case studies worldwide.

During the 2010s and into the 2020s, Pichai played a central role in shaping Google's direction across major product categories including Android, ChromeOS, Google Drive, Gmail, Maps, and YouTube. Under his leadership, Google expanded its focus on AI-first computing, an initiative he announced at Google I/O 2017 and that continues to define Alphabet's strategy into 2025.

One of Pichai's most notable contributions to computer science leadership in recent years is the advancement of Google DeepMind, Gemini AI models, and the integration of generative AI across Google's ecosystem—from Search and Workspace to Android devices. These moves are grounded in real, publicly available initiatives, including the rollout of Google Gemini (2023-2025), which has become one of the most widely referenced AI model families in both academic and industry publications.

Giga Chronicles

Additionally, Pichai has overseen Google's major breakthroughs in quantum computing, including support for the Sycamore and later-generation quantum processors. Alphabet's demonstrations of quantum supremacy and advancements in quantum error correction have been recognized in scientific publications and international research collaborations.

What sets Pichai apart is not just his technological leadership but also his emphasis on responsible AI development, digital safety, and global access to computing. In numerous keynote addresses and interviews, he has emphasized that technological advancement must be balanced with ethical considerations, user safety, and long-term societal benefit.
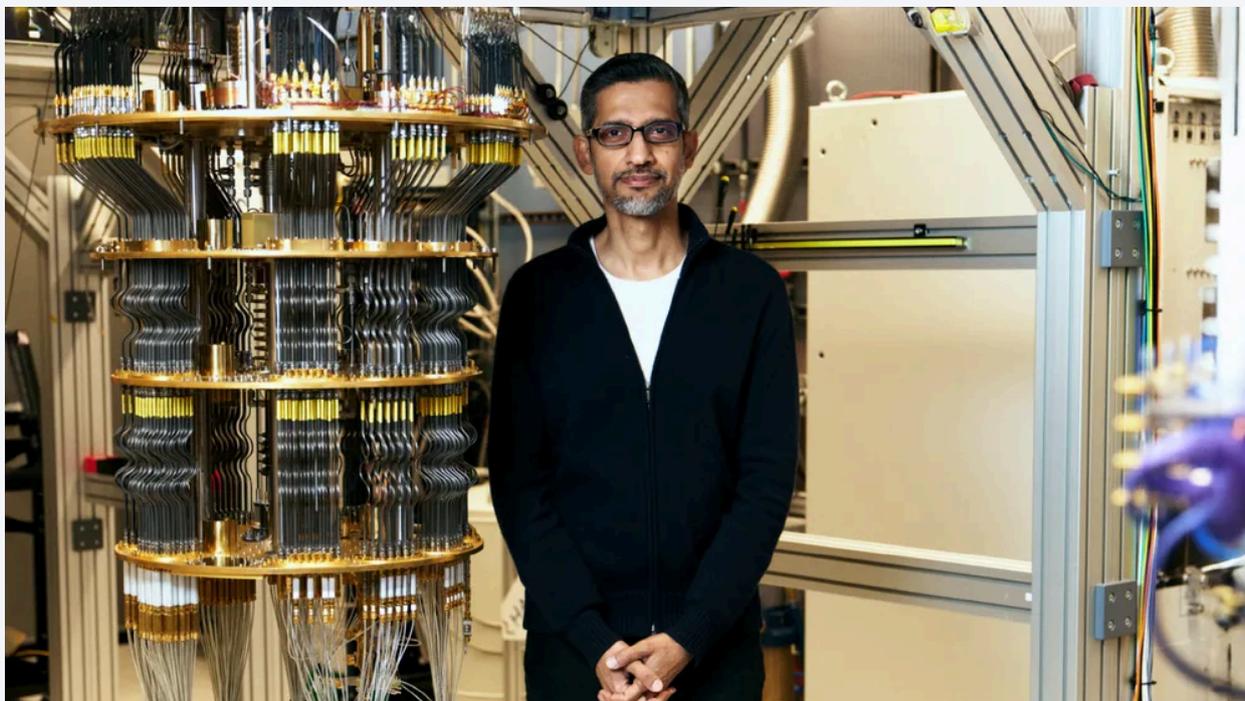
Today, in 2025, Sundar Pichai stands as one of India's most respected global technology leaders. From contributing to everyday user tools to shaping world-leading AI systems, his journey continues to inspire millions of students, engineers, and innovators across India and beyond.


| Article | Lakshmish M Prabhu |
| Credit | 4CB23CS078 |

TECH PREDICTIONS (2025 EDITION)

Foundation Models Will Reshape All Computing

Tech of the future: General-purpose AI foundation models

In 2019, AI automation was still fragmented across narrow domains. But by 2025, the world has moved into an era defined by foundation models—massive neural networks trained on multimodal data and capable of reasoning, planning, and generating content across domains. These include OpenAI's GPT-5 (2024), Google DeepMind's Gemini Ultra (2023-2025), Meta's Llama 3 (2024) and Microsoft's Phi-3 (2024). These models have laid the groundwork for a new generation of computing in which AI is not a tool but the foundational platform atop which all digital interactions are built.
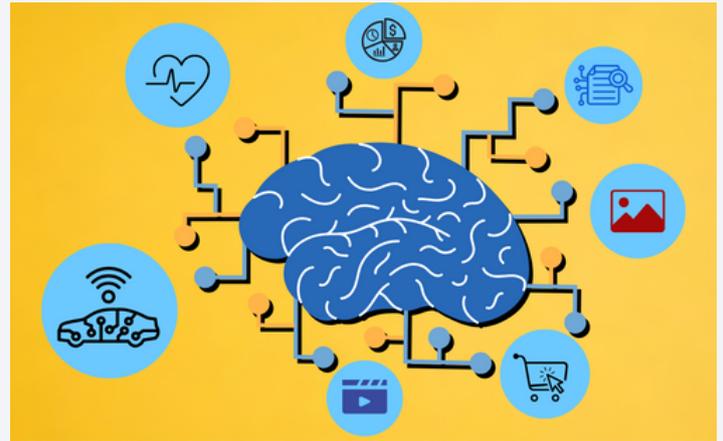
Researchers across the world have published works exploring new architectures such as Mixture of-Experts, efficient transformers, and multimodal encoders, enabling AI systems that understand text, speech, images, video, code, robotics instructions and sensor data. This shift is evident in academic publications like "Scaling Transformer Models" (OpenAI, 2024) and "Gemini: A Family of Multimodal Models" (Google DeepMind, 2024).

Looking ahead, futurists predict that by 2030, AI assistants will be embedded in every computing interface, replacing traditional operating systems. Instead of manually installing apps, users will instruct AI agents capable of performing legal analysis, scientific research, creative design, tutoring, medical triage and complex programming. AI won't just automate tasks it will become a cognitive partner. In this future, foundation models serve as knowledge engines, software orchestrators, and autonomous reasoning machines that reshape society's relationship with digital systems.

Did You Know?

Google's Gemini Ultra demonstrated competitive performance with human experts on MMLU, scoring above 90%—the first model to achieve near-expert general reasoning across 57 academic subjects.

Article Credit	Sathwik P L 4CB22CS114

Quantum Computing Will Become an Industrial Tool Rather Than a Lab Experiment

According to real quantum-research breakthroughs, the shift toward fault-tolerant quantum computing is no longer theoretical. In 2024, Google's Quantum AI team published a landmark paper demonstrating scalable error correction methods using their upgraded Sycamore and Willow processors. IBM's 2023-2024 roadmap led to the release of IBM Condor (1,121 qubits) and IBM Heron (133 qubits), both designed for high-coherence, modular quantum architectures.
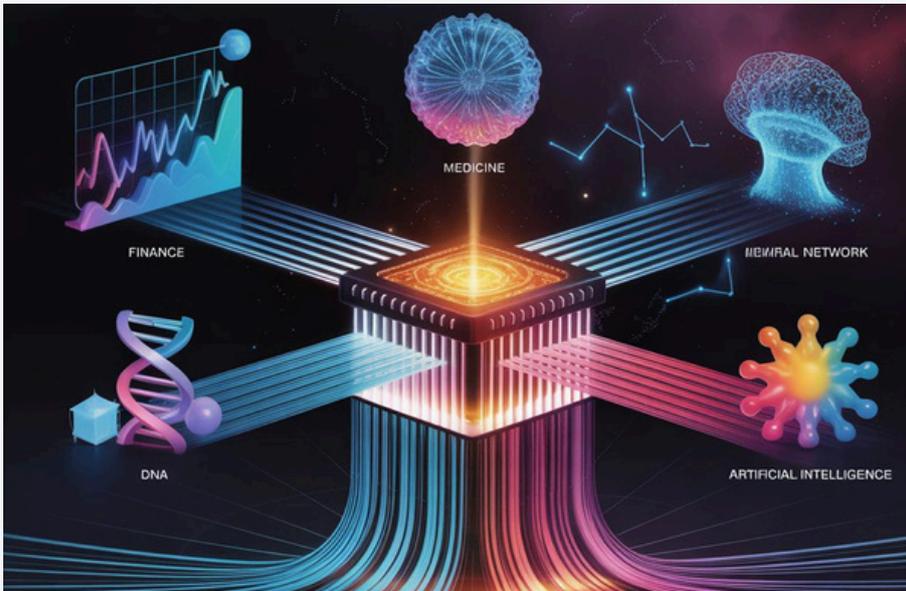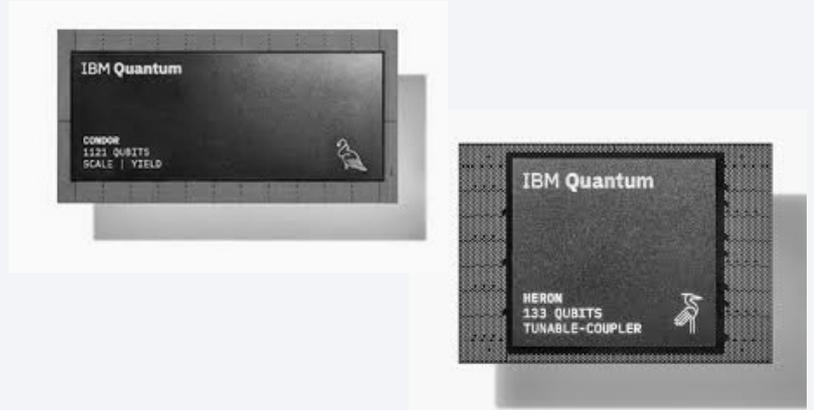
By 2025, quantum computers still cannot break modern encryption or outperform classical systems in all tasks. But they have already proven useful in specialized fields like:

- Materials science (superconductors, catalysts, crystal structures)
- Quantum chemistry simulations (protein folding, drug-interaction prediction)
- Optimization problems in logistics and finance
- Cryptography research, especially in developing post-quantum algorithms, formally standardized by NIST in 2024

The biggest shift in 2025 is hybrid quantum classical computing, where conventional cloud systems integrate quantum accelerators. Major cloud vendors such as Google Cloud, Azure Quantum, and IBM Quantum—now offer APIs enabling developers to run quantum circuits without owning any hardware. Published works such as "Quantum Utility: Real-World Applications" (IBM, 2024) and "Towards Fault-Tolerant Quantum Computation" (Nature, 2023) highlight the accelerating trend of practical quantum algorithms.

Amazing Fact

In 2024, IBM scientists successfully ran the largest quantum simulation of a heavy-fermion material to date, marking the first real scientific discovery assisted by a quantum processor.

Article Credit: B M Yashwanth 4CB22CS020

Robotics Will Achieve Human-Level Dexterity Through AI-Native Control Systems

Modern robotics is undergoing a revolution driven by AI-first control models. Unlike traditional robots programmed through fixed instructions, 2025 robots rely on large-scale imitation learning, reinforcement learning and foundation-model reasoning.

In 2023, Google DeepMind released RT-2 (Robotics Transformer-2), a real published model capable of converting internet-scale language-vision knowledge into robotic actions. This gave robots the ability to generalize tasks they were never explicitly trained for. Similarly, Boston Dynamics began integrating AI-powered control systems into their Atlas and Spot robots, enabling more adaptive navigation and manipulation.

One of the most influential published works in this area is "Open X-Embodiment Dataset" (2024), a joint project by 33 robotics labs that created the world's largest dataset for training general purpose robot behavior models. This is leading to the rise of household task robots, industrial co-bots, and autonomous mobile manipulators capable of navigating dynamic environments.

By 2025, robotics labs such as those at Stanford, CMU, ETH Zürich, IIT Bombay, and Tsinghua use multimodal learning techniques to build robots that:

- Fold laundry
- Handle warehouse logistics
- Perform fine-motor tasks like threading a needle
- Collaborate safely with humans
- Cook, clean and assist the elderly in prototype environments
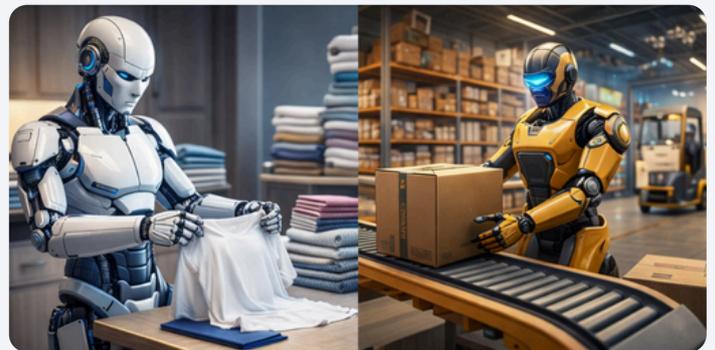
In 2024, OpenAI-backed robotics startup 1X Technologies demonstrated humanoid robots trained via end-to-end AI, capable of performing real household tasks with no hardcoded instructions.

Article Credit | Rani Ramanath Kini 4CB22CS102

Cybersecurity Will Shift Toward Autonomous Defense Systems

By 2025, cybersecurity has become one of the world's most AI-dependent fields. With the explosion of generative AI, cyber-attacks have scaled dramatically: automated phishing, polymorphic malware, deepfake-enabled scams, and large-scale identity attacks.

In response, real-world cybersecurity research from 2023–2025 has focused on AI-powered autonomous defense systems, capable of:

- Real-Time Threat Detection
- Autonomous patching
- Predictive risk modeling
- Behavioral anomaly spotting
- Cross-network reasoning

Microsoft's Security Copilot (2023) and Google's Sec-PaLM (2023) were the earliest AI-powered security engines. By 2025, these systems are deeply integrated into enterprise infrastructure. Academic works like "AI-Driven Threat Detection and Zero-Trust Systems" (ACM, 2024) and "Generative Models in Cyber Deception" (IEEE, 2024) outline how security tools now operate as autonomous agents, continuously scanning environments for vulnerabilities.

The cybersecurity landscape of 2025 includes:

- post-quantum cryptography adoption
- AI-generated honeypots that lure attackers
- autonomous SOC (security operations centers)
- identity-first security frameworks
- AI-based code vulnerability repair tools
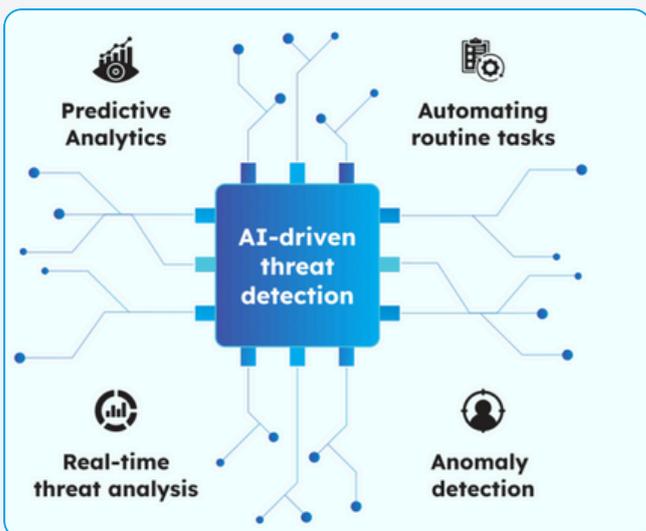
Interesting fact

In 2024, Google reported that AI-assisted security tools reduced threat-response times from hours to seconds, marking the first era of near-instant cyber defense.

Article Credit Anujna K 4CB24CS014

Spatial Computing and Mixed-Reality Interfaces Will Replace Screens

2025 marks the beginning of the post-smartphone era. With the release of Apple's Vision Pro (2024), Meta's Quest 3 (2023), Samsung/Google XR platforms (2024–2025), and breakthroughs in holographic displays, spatial computing has become mainstream.

Spatial computing combines:

👓 **Augmented Reality (AR)**

🥽 **Virtual Reality (VR)**

👁 **Computer Vision**

🗺 **3D Mapping**

💬 **Natural Language Interfaces**

✋ **Gesture-Based Interaction**

🧠 **AI-Driven Scene Understanding**

Real published demos, such as Apple's VisionOS developer documentation, Meta's Mixed-Reality SDK, and Microsoft's HoloLens research papers, illustrate a world where digital objects coexist with physical environments.

By 2025, spatial computing is used for:

- surgical training and real-time AR-guided operations
- architectural visualization
- engineering simulation
- AI-assisted education
- remote collaboration with photorealistic avatars
- industrial maintenance using AR overlays

Companies like NVIDIA have expanded their Omniverse platform, enabling physically accurate industrial simulations and digital twins used by BMW, Siemens, and Tata Motors.

The integration of AR glasses + AI assistants is expected to replace traditional screens by 2035. Instead of searching the web, users will access information visually as overlays in their environment.

Amazing fact

Experts predict that by 2030, more than 1 billion people will use spatial computing devices as their primary interface for work, gaming, education and web browsing.

Article Credit	Himamshu S 4CB24CS052

Technological Advancements and Their Effects on Humanity

Technology continues to **transform** the way humans **live**, **communicate**, **work** and **learn**. Over the past decade, society has shifted dramatically due to:

- **AI automation**
- **Spatial computing**
- **Quantum research**
- **Robotics**
- **Next-generation cybersecurity**
- **Hyper-connected digital ecosystems**

Positive impacts include:

- **increased medical precision** through AI-based diagnosis
- **faster scientific discovery** using quantum-ready algorithms
- **cheaper communication** via global satellite networks
- **democratized education** through AI tutors
- **robots assisting in dangerous jobs**

On the negative side:

- **AI-generated misinformation** threatens truth
- **over-reliance on automation** reduces critical thinking
- **increased surveillance** poses privacy risks
- **energy-intensive computing** impacts the environment

The challenge for society is to balance innovation with ethics, ensuring technology amplifies human potential rather than replacing it. In 2025, humanity stands at the dawn of an era where computers learn, robots adapt, quantum machines compute, and reality itself becomes a mixed-digital landscape. The future is no longer a distant possibility—it is unfolding now.

| Article Credit | Varun K Bhat 4CB24CS175 |
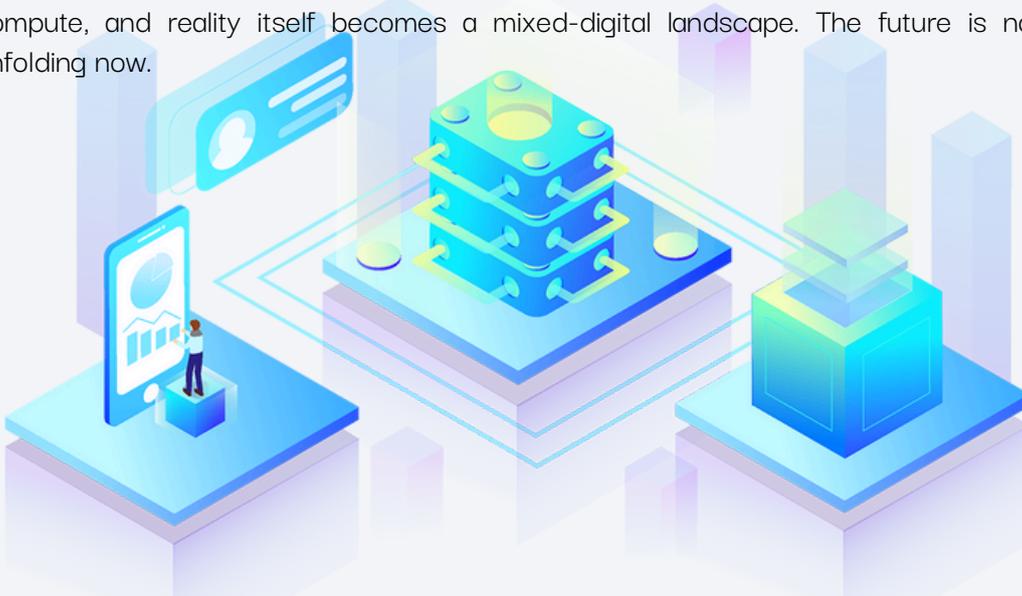
Succesful
START-UPS

Neysa - India's AI Infrastructure Powerhouse

Neysa is a cutting-edge Indian startup that, as of 2025, is emerging as a pivotal name in the global AI infrastructure and deep-tech ecosystem. Founded in 2023 by veteran industry technocrats, Neysa was launched to address one of the most critical bottlenecks in modern AI adoption: high performance computing infrastructure accessible to businesses of all sizes.

Neysa was co-founded by Sharad Sanghi (CEO), previously known for his leadership at Netmagic, and Anindya Das (CTO), former head of R&D at NTT India. Their vision was simple yet ambitious: build a managed, enterprise-grade GPU cloud and MLOps platform that could serve AI startups, research labs, enterprises, and institutions across India at a fraction of traditional infrastructure cost.

Sharad Sanghi
Co-founder & CEO

Anindya Das
Co-founder & CTO

What differentiates Neysa from many other infrastructure providers is its deep integration with generative AI workflows and enterprise pipelines. It offers not only raw GPU compute but MLOps pipelines, automated model training and deployment, fine-tuning primitives, version control, and scalable horizontal resource scheduling. This makes it possible for smaller startups, researchers, and even academic labs to build and deploy large language models, vision models, or multimodal AI systems – without needing their own costly data centers.

In early 2024, Neysa secured a $20 million seed funding round led by major venture investors, followed by a $30 million Series A in late 2024. That brought the total funding to around $50 million and valued the company in the low-hundreds of millions USD by early 2025. This financial backing allowed them to rapidly scale their infrastructure, hiring talent and building clusters of high-end GPUs, high-speed interconnects, and optimized orchestration platforms.

In 2025, Neysa has positioned itself as a key infrastructural backbone for India's booming AI startup ecosystem. With India becoming a global hotspot for generative AI development – in vernacular languages, enterprise automation, fintech, health-tech and more. Many of these newer ventures rely on Neysa's infrastructure to prototype and scale.
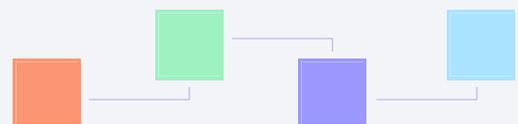
Neysa is also contributing to democratizing access to AI compute: by offering pay-as-you-go GPU/TPU resources and MLOps automation, it lowers the entry barrier for AI experimentation and development. As a result, smaller teams that previously couldn't afford AI infrastructure now can iterate faster, build prototypes, and – when ready – scale seamlessly.

THE SUCCESS STORY OF NEYSA
Key Lessons for the AI Era

01. Infrastructure Matters
In a world increasingly powered by AI, infrastructure matters. Building robust, affordable compute backends is as valuable as building consumer-facing applications.

02. Indian Founders, Global Reach
Indian entrepreneurs with domain-expertise and global exposure can design deep-tech solutions that serve both local and international needs.

03. Democratizing Compute, Democratizing Innovation
Democratizing compute helps democratize innovation – enabling a larger number of talented developers, startups, and researchers to experiment, build and deploy AI systems.

In 2025, Neysa is not just a startup — it's becoming a foundation for India's next generation of AI startups, deep-tech enterprises, and research-driven innovation. Its journey is a powerful testament to how, in the modern era, behind every breakthrough app or AI product, there is often an invisible but indispensable backbone — the cloud infrastructure that makes it possible.

Article Credit	H Sumith Shenoy
	4CB22CS048